

Amateur Radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA
VOL. 56, No 4, APRIL 1988



KENWOOD

TS-680 HF TRANSCEIVER

100 WATTS OUTPUT ON 160 to 10 METRES
10 WATTS OUTPUT ON 6 METRES

The TS-680 is a high-performance HF transceiver designed for SSB, CW, AM and FM modes of operation on all Amateur bands. Covers Amateur bands 160 metres to 6 metres, combining the ultimate in compact size with advanced technology.

Compact and lightweight. CW Full Break-In, Semi Break-In and VOX Circuit. Superior receiver dynamic range. The receive front end has been specifically designed to provide superior dynamic range. The intermodulation dynamic range is 102dB, with an overall intercept point of + 12dBm, noise floor level of -138 dBm. (when the optional 500 Hz CW filter YK-455C-1 installed). 31 Memory channels with split memory channels and memory scroll. Built-in dual-mode noise blanker ("Pulse" or "Woodpecker"). IF shift circuit. Adjustable VFO tuning torque. Switchable AGC circuit (FAST/SLOW) and built in speech processor, RF output power control and "F.LOCK" switch. Non-volatile operating system. Fluorescent tube digital display and squelch circuit (for FM mode).



KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
4E WOODCOCK PLACE, LANE COVE, SYDNEY, N.S.W. 2066. Ph. (02) 428 1455.

YOUR DEALER BELOW WILL GUARANTEE SATISFACTION

Further, beware of dealers not listed in this advertisement who are selling Kenwood communications equipment. All Kenwood products offered by them are not supplied by Kenwood Electronics Australia Pty. Ltd. and have no guarantee applicable.

N.S.W.: EMTRONICS — 94 WENTWORTH AVENUE, SYDNEY (02) 211 0988
 REG STOCKMAN COMMUNICATIONS — CNR BANGKOK BURN ROAD & SHIRLEY STREET, INVERELL (067) 22 1303
 WORMALD COMMUNICATIONS — 51 DENNISON STREET, HAMILTON, NEWCASTLE (049) 69 1399
 ROBERTSON ELECTRONICS — 62 DESMOND STREET, CESSNOCK (049) 90 7908
 MACLELL PYL LTD — 99 KENNY STREET, WOLLONGONG (042) 29 1455
 ALEX JOHNSON — 19 BANKSIA STREET, O'DONNOR, A.C.T. (062) 47 9125
 DX ENGINEERING — 156 GRANITE STREET, PORT MACQUARIE (065) 84 9922
 FRANK BOUNDY — LISMORE (066) 86 2145

INTERSTATE
VIC.: PARAMETERS PTY. LTD. — 1064 CENTRE ROAD, SOUTH OAKLEIGH (03) 575 0222
 EMTRONICS — SHOP 5/10 7, 288-294 QUEEN STREET, MELBOURNE (03) 670 0330
 BROWN SHARPS — 11 MALINGBURY STREET, BALLARAT (033) 39 2808
 SUMNER ELECTRONICS — 78 KING STREET, BENDIGO (054) 43 1977
TAS.: WATSONS WIRELESS — 72 BRISBANE STREET, HOBART (002) 34 4303
N.M.W. & COMMUNICATIONS — 19 CHARLES STREET, LAUNCESTON (003) 31 2711
V.K. ELECTRONICS — 214 MOUNT STREET, BURNIE (004) 31 7733
QLD.: MITCHELL RADIO CO — 58 ALBION ROAD, ALBION (07) 357 6830
 EMTRONICS — 416 LOGAN ROAD, STONES CORNER, BRISBANE (07) 394 2555
S.A. & NT.: INTERNATIONAL COMMUNICATIONS SYSTEMS PTY. LTD. — 8 NILE STREET, PORT ADELAIDE (08) 47 3688
WA.: VALUS ELECTRONICS — 165 ALBANY HIGHWAY, VICTORIA PARK (09) 470 1118
 BAY RADIO — 22 GRACE STREET, PERDUE (09) 451 3561
 FORD ELECTRONICS — UNIT 19, 70 ROBERTS STREET, OSBORNE PARK (09) 242 1766

Amateur Radio



Maria VK5BNT, organiser of the 1987 ALARA-meet.

Special Features

Examination Devolution Update by Jim Linton VK3PC	36
Federal Convention Agenda Items	32
Future of Amateur Radio — Paper 6 — Conclusions & Recommendations	30
Power Line Carrier by Gil Sones VK3AUJ	4
Ron Wilkinson Achievement Award	37

Technical Features

Antenna Calculation Program in Basic by Dean Probert VK5LB	6
Build a Swallower reprinted from TCA	28
Discussion on Mixers by Lloyd Butler VK5BR	16
Getting on Air — Part 3 A Tune-up Indicator by Peter Parker VK6NNN	25
Memory Expansion for the VZ200/VZ300 Computers by Lloyd Butler VK5BR	11
One plus One equals Disaster by Roy Hartkopf VK3AOH	10
Time Division Multiplexing the 1920s way The Bull Transmitter reprinted from the Harmsworth Wireless Encyclopedia	26
Topical Technicalities — 3 by Lindsay Lawless VK3ANJ	31
Try This —	
Clearing Branches & Leaves by Herb Unger VK2UJ	37
Screw Insertion by Herb Unger VK2UJ	40

Regular Features

Advertisers' Index	64
ALARA	45
AMSAT Australia	46
AR Showcase	53
Awards — First Settlers Award	42
— Ron Wilkinson Achievement Award	37
Beacons	47
Club Corner	54
Contests	
— CQ M Contest 1988 — Rules	43
— Ross Hull Memorial Contest 1987 — Results	43

Editor's Comment — The Near and Distant Future	2
Education Notes	48
Electro-Magnetic Compatibility Report	50
“Were you on your radio last night?”	50
Five-Eighth Wave	56

Forward Bias	57
Hamads	63
How's DX — including ARRL DXCC Revised Rules	38
Intruder Watch	42
Magazine Review	54
Morseword No 14	55
Obituaries — Carl Sappatzer, Claud Welsh, Les Johnson, Vern Kenna & Harold Bremmerman	62
Over to you! — members have their say	58
Pounding Brass	49
QSP	
5, 27, 29, 32, 36, 40, 42, 44, 46, 47, 49, 54, 63	
QRM from VK7I	57
Silent Keys — VK3CI, VK6CC, VK3DQJ, VK3FI, VK2BXN, VK7ZAH, VK3QY, VK3PJ, VK4QX, VK2DWH, VK3RV, VK4BEM, VK2NKT & VK2CFW	62

Spotlight on SWLing	44
Try This	
— Clearing Branches & Leaves by Herb Unger VK2UJ	37
— Screw Insertion by Herb Unger VK2UJ	40
VHF UHF — an expanding world	34
VK2 Mini-Bulletin	55
VK3 WIA Notes	56

DEADLINE

All copy for inclusion in the June 1988 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, April 18, 1988.

Amateur Radio

Published monthly as the Official Journal by the Wireless Institute of Australia, founded 1910. ISSN 0002 — 6859. Registered Office: 3/105 Hawthorn Road, Caulfield North, Vic. 3161. Telephone: (03) 528 5962.

EDITOR
BILL RICE* VK3ABP

NEWS EDITOR
JIM LINTON VK3PC

TECHNICAL EDITORS
PETER GAMBLE VK3YRP
PETER GIBSON* VK3AZL
EVAN JARMAN* VK3ANI
DOUG MCARTHUR* VK3UM
GIL SONES* VK3AU

CONTRIBUTING EDITORS
Frank Beech VK7BC
Brenda Edmonds VK3KT
Ron Fisher* VK3KH
Gilbert Griffith VK3CQ
Ken Hall VK3AKH
Roy Hartkopf VK3AOH
Robin Harwood VK7RH
Ron Henderson VK1RH
Cullen Hurst VK3HI
Eric Jamieson VK5LP
Bill Martin VK2COP
Hans Ruckert VK2AOU

DRAFTING
Liz Kline
Ken Kline

FEDERAL OFFICE MANAGER
(Mrs) Ann McCurdy

***Members of Publications Committee**
Inquiries and material to:
The Editor,
PO Box 300,
Caulfield South, Vic. 3162.

Material should be sent direct to PO Box 300, Caulfield South, Vic. 3162, by the 20th day of the second month preceding publication. Note: Some months are a few days earlier due to the way the days fall. Check page 1 for deadline dates. Phone: (03) 528 5962.

HAMADS should be sent direct to the same address, by the same date.

Acknowledgment may not be made unless specifically requested. All important items should be sent by Certified Mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

TRADE PRACTICES ACT
It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with strictly.

VICTORIAN CONSUMER AFFAIRS ACT
All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

Production: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, Vic. 3138.
PAX:(03) 726 7059

Laser Scanned Colour Separations by:
QUADRACOLOR INTERNATIONAL (AUSTRALIA) PTY LTD
3 Lake Drive, Dingley, Vic. 3172.
Tel:(03) 551 3333

Typesetting by: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, Vic. 3138.

Make up and Photo Reproduction by: EASTERN ADVERTISING PTY LTD
PO Box 556, Lyndale, Vic. 3140
Tel:(03) 735 5410

Printed by: LEADER WESTERNPRINT PRINTING PTY LTD
1 University Place, Clayton North, Vic. 3168.
Tel:(03) 580 5111

Mail Processing by: AUTOMAIL PTY LTD
14 Stamford Road, Oakleigh East, Vic. 3166.
Tel:(03) 588 6677

Opinions expressed by individuals are not necessarily those of the Wireless Institute of Australia.



Editor's Comment

THE NEAR AND DISTANT FUTURE

To begin in the immediate past, it is with some reluctance (there are people who would call it laziness!) that I allow myself to be pushed back into the hurly-burly of editorial life. Our month in New Zealand was very enjoyable, although somewhat tiring, and it seems appropriate not to jump straight back in with both feet, but take it easy for a while!

Only three days after posting my last "Comment" (at Westport, on the South Island) we had the great pleasure of renewing acquaintance with Terry Carrell ZL3QL, who is President of the NZART. It turned out that he was heading for Queenstown for a few days break, and arriving on the only night that we were there. This was gleaned via the Queenstown repeater (the highest in New Zealand at 2286 metres) and Terry and Russ ZL4JW were with us at our camper-van not long after. We were delighted to accept Terry's invitation to his home at Christchurch just a week later, together with Craig Crawford ZL3TLB, editor of *Break In*. Both our magazines share a number of problems, probably the greatest being high costs and relatively small circulation, and the possibility of in some way sharing some of these costs is being considered. As has been custom for some years, each of our Societies invites representatives from the other to its annual Convention, and Terry will be with us later

this month. Trans-Tasman co-operation will certainly develop even more.

Organisational changes at home are also on the Convention agenda. There is a motion from VK3 to bring about a referendum of all members on a proposal to disband the Divisions and convert the Institute into a unified national body (as NZART, and for that matter most of the world's amateur societies, already are).

Much further into the future, I was intrigued to hear of a reply by an un-named VK4 to my editorial question in February as to whether amateur radio will still exist in 2188. So far, I have only heard his letter read on a Divisional broadcast, and have not seen a copy, but after talking about gravitational waves he goes on to suggest that neutrino flux may be a future communication medium. It may even be that by this means we for rather, our descendants could be able to communicate instantaneously over interstellar distances with intelligent aliens! I wonder whether any of them will be readers of Volume 256 of *Amateur Neutrino* (formerly *Amateur Radio*)? If it is imaginable, it will happen. Even if it is unimaginable it is still a possibility. Or is it?

Bill Rice VK3ABP
Editor



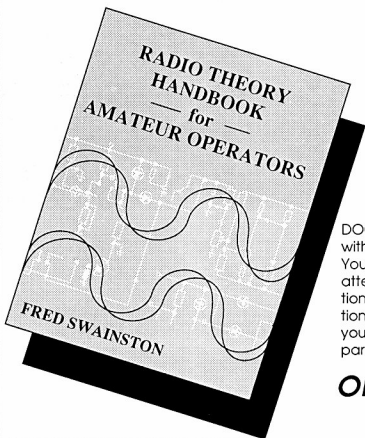
INSATIABLE APPETITE

Amateur Radio is always in need of a steady supply of articles for publication, whether they be short technical tips or long technical articles; even interesting anecdotes. Whilst articles on advanced and new techniques are needed, it must not be forgotten that new amateurs and novices are always interested in good basic items which the "seasoned amateur" may class as too basic for AR. So, write-up that project that has worked for you, as *Amateur Radio* has an enormous appetite for a well-balanced and varied diet.

Preparing an article for *Amateur Radio* is very simple. Just commit your

thoughts to paper as you would when explaining to a friend over the air. Manuscripts may be clearly handwritten or typed **original** copies (no photocopies please as the photocopier invariably prints blank in a crucial portion of a technical explanation or mathematical formula). Include circuit diagrams if applicable — they do not have to be ready for publication (clear sketches are adequate). Don't overlook a photograph too, but please be careful when labelling them — many good photographs have been damaged by heavy ball-point pen marks coming through from the back or felt-tip pens smudging from the back of one to the front of another!

The essential "hams" reference



Written specifically to cover the Department of Communications syllabus for the Novice and Amateur Operator Certificate of Proficiency, this new book will be invaluable whether you are preparing for the exam, or an "old hand".

This book treats all topics in the DOC syllabus, explaining each topic with numerous worked examples. You can test your understanding by attempting the multitude of questions in each chapter. Many questions are from past DOC exams, so you can be sure this book will prepare you to pass!

ONLY \$39.95

You need buy no additional text to prepare for the D.O.C. exam!

ORDER NOW

Please rush me ____ copy/copies of "Radio Theory Handbook for Amateur Operators" at \$39.95

Name _____

Address _____ P/code _____

PAYMENT DETAILS: Please ☒ the appropriate boxes below and sign:

☐ Enclosed cheque for \$ _____

☐ Please charge my ☐ BANKCARD ☐ MASTERCARD

Credit Card No. _____ Expiry Date _____ Signature _____

PLEASE SEND THIS FORM TO:



Prentice Hall of Australia Pty. Ltd.
7 Grosvenor Place, Brookvale NSW 2100
Telephone: (02) 939 1333 Fax: (02) 938 6826

POWER LINE CARRIER

Gil Sones VK3AUI

30 Moore Street, Box Hill South, Vic. 3128

**A new form of communication?
No! It is a method of employing
power transmission lines to serve
a dual purpose in conveying power
and the transmission of pertinent
information concerning the
demand factors and other
pertinent information. Read on for
a detailed description of how it
works!**

Power Line Carrier is the name of a means of communication over a High Voltage Power transmission Line.

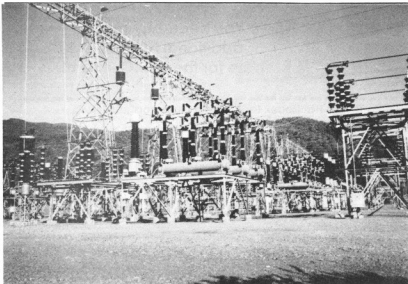
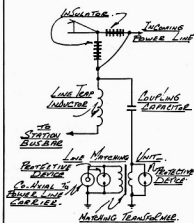
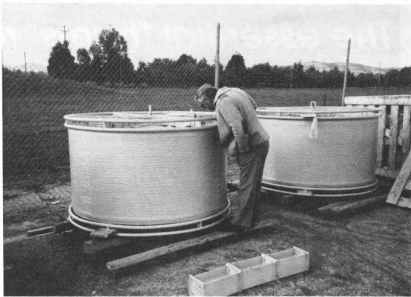
The communications channel uses a much higher frequency signal than the AC mains frequency of 50 Hz. This high frequency signal is superimposed on the transmission line and is known as a carrier wave. Hence the name Power Line Carrier.

The transmission line used to move AC power from the point of generation to the point of use is of necessity a low loss transmission line. While it is primarily designed for AC power transmission it has low loss properties to quite high frequencies. The low loss properties extend up to at least the region of the medium Frequency Broadcast Band.

The loss in the region below the Broadcast Band is very small. There is little chance of interference with other services from the small amount of signal lost by radiation.

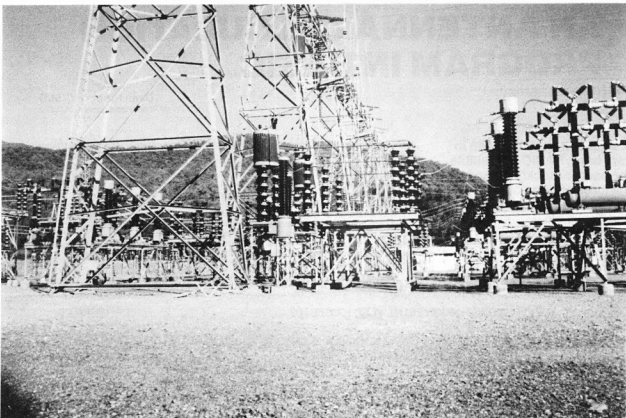
Frequencies used are co-ordinated with other users of the Frequency Spectrum to minimise problems. The band used is from 80 to 480 kHz. The bottom end of the band used is sufficiently removed from the power frequency to allow the use of relatively simple filters to separate the AC mains and the carrier frequency. Losses must be kept very low at the power frequency. A very minor and insignificant loss in decibels represents a surprisingly large amount of heat. A loss of 0.1 decibel at a megawatt power level is a loss of nearly 23 kilowatts. A lot of heat to dissipate!

The transmission line is isolated at carrier frequencies from the power equipment by large RF chokes. These are called line traps. They must carry the normal current of the power



Line Traps — both Pedestal and Suspension Mounting.

Figure 1: A Typical Communications Installation.



Power Line Carrier Traps and CTVs.

system and be capable of withstanding fault currents. The fault current when a 220 kV or 330 kV line is shorted, is very high. The forces generated by such currents are enormous. The line-trap is designed to accept and survive such currents and forces.

The signals are coupled onto the power-line by coupling capacitors. These are large oil filled capacitors. They look to the uninitiated like large insulators. They must withstand the High Voltage Line voltage of 220 to 500 kV. These capacitors must also be designed to withstand surges due to lightning and transients on the power system.

The Line Traps are designed to have an impedance of between 600 and 1000 ohms at the carrier frequency. This means an inductance of around one millihenry. Other components are used within the trap to ensure operation between 80 kHz and 480 kHz. This broadbanding means that the Line Traps can be used for any carrier frequency within the band.

The Coupling Capacitors have a capacitance of between 1000 pF and 10 000 pF. They are often combined with a capacitive voltage transformer which is used to measure the line voltage. They are then known as a CVT.

Both the Line Traps and the Coupling Capacitors or CVTs are physically large and expensive items of equipment. They are items of an electrical plant found in the switchyard of a large power station or substation. They are represented quite simply on a block diagram.

The final plant item is a coupling transformer, which together with voltage surge limiting components, is housed at the base of the CVTs or coupling capacitors. The transformer

matches the impedance seen at this point to a coaxial cable to the power line carrier equipment. It is called the Line Matching Unit.

The circuit, comprising the power line and the coupling apparatus is shown in the diagram, see Figure 1.

Several stages of over voltage protection are used. This is to prevent surges and transients being impressed on the electronic equipment in the Power Line Carrier. More important than the equipment is the safety of the telephone user.

The power line carrier is essentially a single channel Single Sideband transmitter and receiver. The transmit and receive directions are separated by filters and a hybrid. Thus separation is adequate to allow adjacent transmit and receive frequency blocks. For example Transmit 144 kHz to 148 kHz with Receive from 152 kHz to 148 kHz. Thus a whole channel occupies an 8 kHz block.

The transmitted level is around one watt or 30 dBm with the received level around 0 dBm or one mW.

Due to the many sources of noise in the system the signal-to-noise ratio is not as good as for normal carrier telephone systems. However, it is adequate for Data transmission or speech. Speech circuits are often processed through Companders to enhance the apparent signal to noise ratio.

The systems are used for the control of the system. This may be by means of telephone calls by electrical operators. However, both Data and control signals are passed over the power line carrier circuit.

The control signals control the operation of circuit breakers which can isolate the fault are

allowed to trip. This limits the extent of the power system disturbance.

These control signals and power-line carrier systems should not be confused with the tones which are sometimes used in the distribution system. These tones are audio frequencies used to control domestic water heaters and the like.

A similar technique is used on a small scale in some domestic intercoms. These work at low levels on the power wiring in your house. They are using the same principle but on a much more limited scale.



QSP

WHAT'S NEWS?

A definition of "news" is something that is new and of interest. In the diverse hobby of amateur radio things are happening all the time that would fit that definition — but we need to learn about it before it can become published news.

Just spend a minute and give thought to whether you know of some news. Then pass it on to the WIA journal, *Amateur Radio* magazine.

Even just a news tip-off or an accurate snippet could lead to a worthwhile article. Maybe something has been printed in your local newspaper about our hobby — take a clipping and put it in the post without delay.

Send your material to the Editor, AR Magazine, Wireless Institute of Australia, PO Box 300, Caulfield South, Vic. 3162.

AN ANTENNA CALCULATION PROGRAM IN BASIC

Dean Probert VK5LB

RMD Verral Road, Hope Forest, SA. 5172

A simple program written in very basic BASIC will enable the user to quickly compare the sizes of booms, elements and spacing between quads and Yagis, etc.

The writer found a need to design and compare both Yagi and quad antennas for his QTH. Being tired of "number crunching" on a calculator, it was decided to write a program in little bits, adding to it as required. Eventually, the program fitted all requirements but it can be easily modified by readers to their requirements.

It was written on a VIC 20, but will operate equally well on the C-64 as no memory locations are used. To use it on other machines it will be necessary to substitute the reversed heart symbol (an instruction to clear the screen) and the reversed Q symbol (which clears any calcu-

lations in memory which are not wanted). Incidentally, the reversed heart is made by using the shift and CLR/HOME keys together and the reversed Q is the Ⓚ key.

The original program was in pretty colours and also contained a clock program. However, these bits have been deleted for brevity. Also, a 4:1 coaxial balun was needed to feed a folded dipole driven element and back to open wire feeder as the tower is about 500 feet from the shack, so a long run of coaxial cable was out of the question, in dollars and dB terms. Have fun!

```
10 PRINT"Q ANTENNA CALCULATION PROGRAM":PRINT:PRINT"BY VK5LB"
11 FOR T=1 TO 2000:NEXT:PRINT"Q":GOSUB100
13 PRINT"Q"
14 INPUT"FREQUENCY?";FQ
15 INPUT"SPACING FOR A";SP
16 INPUT"SPACING FOR B";TU
17 INPUT"SPACING FOR C";EG
18 INPUT"SPACING FOR D";XY
19 PRINT" "
22 WL=INT(((492/FQ)*2)*100+.5)/100
30 R=INT(500/FQ*100+.5)/100
31 A=WL*SP
40 DE=INT(475/FQ*100+.5)/100
41 B=WL*TU
50 D1=INT(455/FQ*100+.5)/100
51 C=WL*EG
60 D2=INT(450/FQ*100+.5)/100
61 D=WL*XY
70 D3=INT(448/FQ*100+.5)/100
```

```

75 PRINT"R= ";R: PRINT"A= ";A: PRINT"DE= ";DE: PRINT"B= ";B: PRINT"D1= ";D1:
   PRINT"C= ";C:
80      PRINT"D2= ";D2: PRINT"D= ";D: PRINT"D3= ";D3:
85 PRINT"WL= ";WL:
87 PRINT" "
90 PRINT"1=YAGI 2=MAIN PROGRAM 3=QUAD"
92 PRINT" "
94 INPUT"YOUR SELECTION";G
96 ONGGOTO 13,109,190
100 PRINT" "
101 PRINT"THIS PROGRAM IS FOR GENERAL ANTENNA DIMENSIONS"
102 PRINT" "
103 PRINT"1 = YAGI 2 = QUAD 3 = DIPOLE 4 = G/PLANE 5 = COAXIAL BALUN"
104 PRINT" "
105 INPUT"YOUR SELECTION";G
106 ONGGOTO 13,190,300,400,500
109 PRINT"■"
110 PRINT"R= REFLECTOR
      DE= DRIVEN ELEMENT
      D1= DIRECTOR 1"
120 PRINT"D2= DIRECTOR 2
      D3= DIRECTOR 3
      A= R TO DE
      B= DE TO D1"
130 PRINT" C= D1 TO D2
      D= D2 TO D3
      WL= WAVELENGTH IN FEET":GOTO100
190 PRINT"■"
200 INPUT"FREQUENCY?";FQ
202 INPUT"SPACING FOR A";SP
204 INPUT"SPACING FOR B";TU
206 INPUT"SPACING FOR C";EG

```

```

208 INPUT"SPACING FOR D";XY
220 WL=INT(((492/FQ)*2)*100+.5)/100
230 R=INT(1030/FQ*100+.5)/100
231 A=WL*SP
240 DE=INT(1005/FQ*100+.5)/100
241 B=WL*TU
250 D1=INT(975/FQ*100+.5)/100
251 C=WL*EG
260 D2=INT(975/FQ*100+.5)/100
261 D=WL*XY
270 D3=INT(975/FQ*100+.5)/100
271 PRINT " "
273 H=INT(((R/4)/SQR(2))*100+.5)/100
274 PRINT"SPIDER ARM-BOOM TO TIP LENGTH IS ";H
278 GOTO75
300 PRINT "V"
310 INPUT "FREQUENCY"; FQ
320 PRINT " "
330 DP=INT((468/FQ)*100+.5)/100
350 PRINT "DIPOLE=";DP
360 PRINT " "
370 PRINT "1=MORE 2=MAIN PROGRAM"
375 PRINT " "
380 INPUT "YOUR SELECTION";G
385 ONGGOTO 300,390
390 PRINT "V":GOTO100
400 PRINT "V"
410 INPUT "FREQUENCY";FQ
420 PRINT " "
430 GP=INT((234/FQ)*100+.5)/100
440 RD=INT((GP*1.025)*100+.5)/100

```

```

450 PRINT "G/PLANE=";GP
460 PRINT "RADIALS=";RD
470 PRINT " "
475 PRINT "1=MORE 2=MAIN PROGRAM"
480 PRINT " "
485 INPUT "YOUR SELECTION";G
490 ONGGOTO 400,495
495 PRINT "v":GOTO100
500 PRINT "vqqq"
510 PRINT "DIMENSIONS FOR 4:1 COAXIAL BALUN"
515 PRINT " "
517 PRINT "NOTE THAT THIS DIMENSION REFERS TO THE
      LOOP OF THE BALUN"
520 PRINT " "
530 INPUT "FREQUENCY FOR BALUN";FQ
540 PRINT " "
550 PRINT "VELOCITY FACTOR OF COAX?"
551 PRINT " "
552 PRINT "SOLID DIELECTRIC = .66"
553 PRINT "FOAM DIELECTRIC = .80"
554 PRINT " "
555 INPUT "ENTER FOR YOUR CABLE";V
560 L=INT((492/FQ*V)*100+.5)/100
565 PRINT " "
570 PRINT "LENGTH=";L
580 PRINT " "
590 PRINT "1=MORE 2=MAIN PROGRAM"
591 PRINT " "
592 INPUT "YOUR SELECTION";G
593 ONGGOTO 500,595
595 PRINT "v" GOTO100

```

COMPUTER PROGRAMS

Due to the length and quality of some computer program printouts, it is frequently impossible to reproduce them effectively for others to copy. Members interested in particular programs are advised to contact the author for an original copy of the relevant program. (Please include an SASE).

Authors of computer program articles, please remember to send a copy of your program on disc or cassette when sending an article for evaluation.

ONE PLUS ONE EQUALS DISASTER

Roy Hartkopf VK3AOH
34 Toolangi Road, Alphington, Vic. 3078

This story involves two electrical faults, each relatively harmless in itself but which, in combination, present a highly lethal situation.

THE FIRST FAULT was in a small horizontal grill. It had been working faultlessly as long as anyone could remember. A simple check with a test lamp showed that the metal frame was grounded with the switch at the power point on or off. The fault which did not show up under these conditions was the fact that the ground and neutral connections were transposed. But since the ground and neutral are normally connected at the fuse box the transposition had no practical effect. It is worth noting that if a core balanced circuit breaker as described in AR, September 1987, had been used it would have picked up the incorrect wiring immediately since the return was through the earth wire.

In due course the family, complete with grill, went on holiday, staying at various caravan

spots. Everything went well until the return trip. At a caravan park where they had stayed a couple of weeks previously they found the grill was not working. It seemed obvious that the element had gone open circuit but since a multimeter was available a confirmatory check was made. It was only then that the fault mentioned above was discovered. But the grill had worked at another site at that same caravan park only a couple of weeks before. Consideration led to a frightening thought. What if the live and neutral at that particular power box had been transposed? The frightening thought became an even more frightening reality and the lethal situation which resulted is shown in Figure 1.

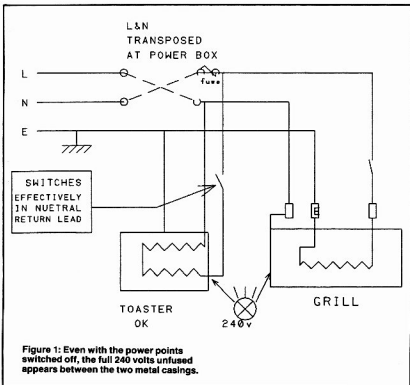


Figure 1: Even with the power points switched off, the full 240 volts unfused appears between the two metal casings.

Since all the power points in the caravan were correctly wired the switches were in what was now the neutral.

Before getting the owner of the park, a little demonstration was set up. A toaster was plugged into one side of the twin power point and the grill very cautiously plugged into the other. It was really frightening to see a test lamp light to full 240 volt brilliance when connected between the metal casing of the grill and the metal casing of the toaster. It made no difference whether the switches at the power outlet were off or on! It certainly impressed the owner of the park!

How would a situation like this arise? I do not believe it is entirely random or accidental. Some years ago I had a radio and electrical business in Scotland. No restrictions were placed on electrical work and the authority was not interested in who did the job, but only whether it was properly done. On being notified that the work was completed an inspector came around. If he was satisfied, the final connection was made. If not, the person who did the work had to put it right and pay the full cost for the next inspection.

In Victoria however, one can have all the qualifications in the world but only an approved electrical contractor can do any electrical wiring. The practical result of this is that jobs (to save money) are sometimes done by incompetent people and inspected by nobody? Consequently there are more shoddy jobs than I ever saw in Scotland where it was possible for anyone to have their work checked openly and legally. One wonders how the job in the caravan park was done.

The situation regarding the grill also seems rather peculiar. I assumed that someone had transposed the leads out of ignorance. To my surprise I found the green wire was connected to a terminal differing from the other two and clearly stamped with an "E". The only trouble was that this terminal did not go to the frame but to one end of the element. Close examination seemed to indicate that it had been wired that way when it was originally made. Another case of non-inspection? I hope there are not a number of these quietly waiting for a potentially lethal disaster.

(Roy's "shocking" discovery suggests that if you have one of those little three-pin neon testers it could be worth taking on holiday. Also, the supply authority would appreciate being informed of dangerous installations. Ed).

MEMORY EXPANSION FOR THE VZ200/VZ300 COMPUTERS

Lloyd Butler VK5BR

18 Ottawa Avenue, Panorama, SA. 5047

The unit described extends the memory of the VZ200 by 20 k bytes and the VZ300 by 18 k bytes.

IF YOU OWN a VZ200 or VZ300 computer, you could be interested in extending the memory to run larger programs. To do this, you may choose to visit the nearest Dick Smith store and purchase a memory expansion module. Alternatively, you may take the second option and build one yourself.

The writer decided on the second option and designed the unit described in this article. Making use of the 8 k static RAM packages, now readily available, assembly of the unit was a straightforward task.

DESCRIPTION

Two 8 k static RAM packages, Type 6264, provide 16 k bytes of additional memory. To simplify decoding of memory chip selection, the start locations of the 8 k RAM packages are connected at precise 8 k (or 2000 H) address multiples within the address range. Because the in-built memories of the VZ200/VZ300 do not end just prior to such locations, one additional 2 k RAM Type 6116 is used to fill in the gap at the end of the VZ300 internal memory and two at the end of the VZ200 internal memory. For the VZ300, the memory is therefore extended by 18 k bytes. (This, with the in-built system ROM and in-built RAM, utilises all of the 64 k address range of the VZ300 computer). For the VZ200, the memory is extended by an additional 20 k bytes.

The wiring diagram for the expansion unit is shown in Figure 1. The 8 k RAM packages (28 pin DIL) are shown as N3 and N4 and the 2 k RAM packages (24 pin DIL) as N5 and N6. Chip select decoding is carried out by two 74LS138 decoder packages (16 pin DIL) shown as N1 and N2. A five volt regulator, N7, is included in the unit to supply power to the IC packages. This was thought desirable as total loading on the internal five volt supply might have been marginal with the extra load of the expansion unit.

A three pole, two position, switch (S1) is provided to select decoding for either VZ200 or VZ300. (The switch used was a four pole unit with one redundant section). If only the VZ300 facility had been required without the VZ200, the 2 k RAM (N6), resistor R1 and the switch, could have been omitted. In this case, switch connections S1A and S1B for the VZ300 would be bridged.

The hexadecimal start addresses for the RAM packages are shown in the following table with the decimal addresses, as identified by the BASIC interpreter, shown in brackets.

PACKAGE	VZ200	VZ300
N5 (2 k)	9000 H (28672)	8800 H (18432)
N6 (2 k)	9800 H (26624)	not used
N3 (8 k)	C000 H (16384)	C000 H (16384)
N4 (8 k)	A000 H (24576)	E000 H (8192)

The complete memory map, with expansion unit included, is illustrated in Figure 2.

A further option for the VZ200 (but not used by the writer) could be to parallel up the buses for a third 8 k 6264 RAM to be started at E000H. This would then extend the VZ200 also to the full 64 k capacity. All that would be required for additional chip selection would be to connect the RAM chip select (pin 20) via a switch circuit (similar to S1C) to pin 7 on decoder N1.

ASSEMBLY

The assembled module card is shown in Figure 3. A general purpose circuit board was used to mount the IC sockets and other components. There are various types of board, with printed circuit pads for solder connections, which can be used to do the job. Another method would be to make use of wire-wrap with wire-wrap type IC sockets.

The card was cut to the dimensions 145 by 92 millimetres. It could have been made smaller but allowance was made for components to be added had they been needed. (This is a practice which often pays off on a first attempt at a design).

A 69.5 millimetre length of 0.1 inch (2.54 millimetres) pin spacing edge connector was fitted to the card. The edge connector was carefully cut so that the 22 pairs of pins used are centred to mate with the printed circuit edge pins on the VZ memory expansion connector and so that the edge connector is correctly guided by the recess in the VZ case. The fitting of the edge connector to the circuit board is offset so that it clears the I/O expansion entry. The method of assembly is similar to that previously used by the writer in the RTTY/Morse module described in *Amateur Radio*, September 1985 and January 1986.

A light aluminium box, 96 by 156 by 24 millimetres, was constructed and fitted around the card for protection. The connector protruded through the end of the box so that it could project into the VZ connector recess.

CHECKOUT

Having made sure all the wiring was correctly routed by carrying out a continuity check, the next step was to devise a functional check routine and a program in BASIC was prepared to

check out the additional RAM. This is listed in the Appendix.

For each memory address, the program writes zeros into all bits and then reads the address to check for concurrence. The process is repeated for ones in each bit and then again for zeros. The memory is accessed sequentially over the whole extended range and, if an address does not read as written, the sequence is stopped and the address identified. The option is then given whether to proceed or escape from the routine. If all memory addresses check out, the memory is flagged as "OK".

At the start of the program there are POKE statements which shift the location of the top of the memory pointer and the stack pointer to within the internal memory. This is necessary as, at power up, the inbuilt VZ monitor automatically searches for the top of memory and references to these pointers to the top part of the expansion memory about to be accessed. If not relocated, the program will "crash" when it gets near the top. Actually there are two separate routines. The first one, which resets the pointers, is started by a RUN command. At its end, this routine requests a RUN 20 command which is used to start the next routine containing the memory scanning process. One might think that it could all be done in the one routine but the writer could not get it to work that way!

The inbuilt BASIC interpreter is comparatively slow and to run this program through the full 20 k bytes of additional memory takes about three-quarters of an hour. (It is a good plan to go away and make a cup of coffee while it is all going on!). Preparation of an object deck would have speeded up the process but this was not considered warranted for the few times the program was to be used.

CONCLUSION

Use of the 8 k static RAMs provides a simpler circuit design than that of the stock dynamic RAM expansion unit published in the VZ200 Technical Reference Manual. The static RAMs are expensive but, providing one does not mind spending a little time on construction, the unit described can be considered to be reasonably cost effective as well as providing a little more memory than the stock unit.

APPENDIX

Expansion RAM Test Program

```
10 REM EXTENSION MEMORY RAM
   CHECK
14 POKE 30880,255:POKE 30881,141
```


N/C	1	28	VCC
A12	2	27	W
A7	3	26	E2
A6	4	25	A8
A5	5	24	A9
A4	6	23	A11
A3	7	22	G
A2	8	21	A10
A1	9	20	E1
A0	10	19	D07
D00	11	18	D06
D01	12	17	D05
D02	13	16	D04
VSS	14	15	D03

A7	1	24	VCC
A6	2	23	A8
A5	3	22	A9
A4	4	21	W
A3	5	20	G
A2	6	19	A10
A1	7	18	E
A0	8	17	D07
D00	9	16	D06
D01	10	15	D05
D02	11	14	D04
VSS	12	13	D03

PIN NAMES

A0-A12	ADDRESS
W	WRITE ENABLE
E1, E2	CHIP ENABLE
D00-D07	DATA INPUT/OUTPUT
VCC	+ 5V POWER SUPPLY
VSS	GROUND
G	OUTPUT ENABLE

6264

N1-N2 74LS138
DECODER

N3-N4 6264
8K*8RAM

N5-N6 6116
2K*8RAM

C2-C7 0.1uF
CONNECTED ACROSS
5V RAILS AT EACH
1/C N1-N6

PIN NAMES

A0-A10	ADDRESS INPUT
D00-D07	DATA INPUT/OUTPUT
W	WRITE ENABLE
G	OUTPUT ENABLE
E	CHIP ENABLE
VCC	POWER +5V
VSS	GROUND

6116

A0	1	16	VCC
A1	2	15	D0
A2	3	14	D1
E1	4	13	D2
E2	5	12	D3
E3	6	11	D4
D7	7	10	D5
GND	8	9	D6

PIN NAMES DESCRIPTION

A0-A2	ADDRESS INPUTS
E1, E2	ENABLE INPUTS (ACTIVE LOW)
E3	ENABLE INPUTS (ACTIVE HIGH)
D0-D7	OUTPUTS (ACTIVE HIGH)

FIGURE 1

V2200/V2300 EXPANSION
MODULE WIRING DIAGRAM

74LS138

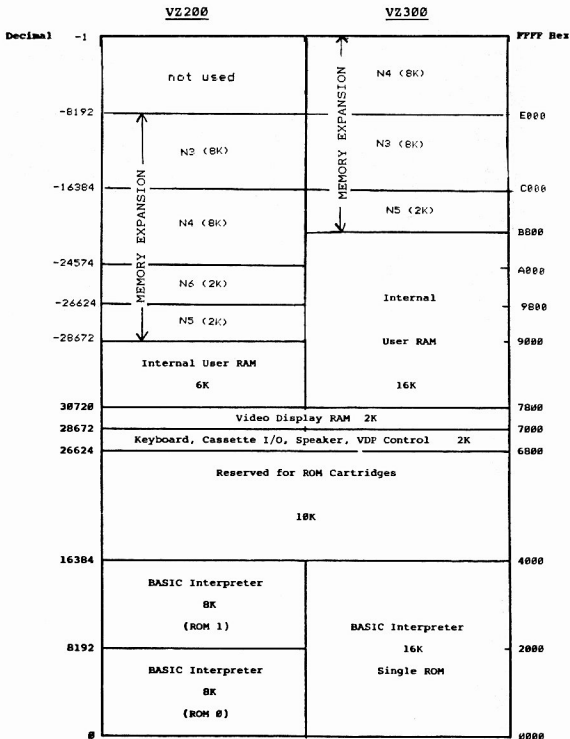


Figure 2: Memory Map showing Expansion RAM.

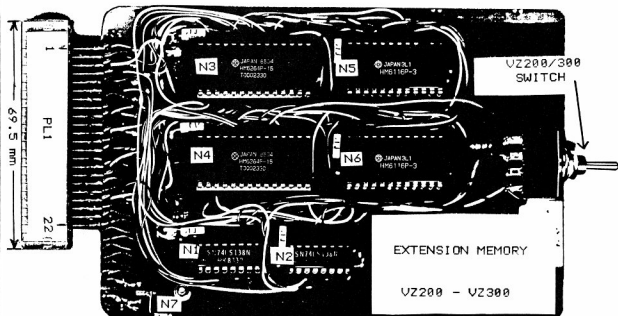


Figure 3: Card Layout.

```

15 POKE 30897,255:POKE 30898,143
16 PRINT "ENTER RUN 20"
17 END
20 PRINT "EXTENSION MEMORY TEST"
30 PRINT "ENTER 200 FOR VZ200 OR 300
   FOR VZ300
40 INPUT A
50 IF A = 200 THEN S = -28672 ELSE S =
   -18432
60 IF A = 200 THEN F = -8193 ELSE F =
   -1
70 L = 0
80 FOR X = S TO F
90 I = 0
100 FOR Y = 1 TO 3
110 IF Y = 2 THEN K = 255 ELSE K = 0
120 POKE X,K
130 B = PEEK(X)
140 IF B <> K THEN I = 1
150 NEXT Y
160 PRINT X
170 IF I = 0 THEN GOTO 230
180 L = 1
190 PRINT "RAM FAULT AT "; X
200 PRINT "ENTER C TO CONTINUE
   CHECKS OR E TO END"
210 INPUT Z$
220 IF Z$ = "E" THEN GOTO 250
230 NEXT X
240 IF L = 0 THEN PRINT "EXTENSION
   RAM OK"
250 END

```

"CQ DX — New Countries only, please!"

—VK2COP



A Discussion on Mixers

Lloyd Butler VK5BR

18 Ottawa Avenue, Panorama, SA. 5041

One only has to examine the output of a mixer on a spectrum analyser to realise that it is a complex device. Here we examine some of the principles of mixing and mixing devices.

NUMEROUS MIXER STAGES are found in modern transmitters and receivers. These are well-known as devices which produce, from two initial frequencies, additional frequency components equal to the sum and difference of the others. One of these new components is separated from the others by selective tuning or bandpass filters. Actually, a multitude of other frequency components is generated and these must also be considered in the transmitter and receiver design.

All kinds of problems can occur from the mixing process and, if you are interested in experimenting with your own equipment designs, an "in-depth" study of the mixing process is well worthwhile. In the following paragraphs an attempt is made to study some of the basic principles involved.

MIXING PRINCIPLE

If two signals of different frequency are fed through a linear device, they will appear at the device output as the same two frequencies. To mix two signals we require a curved or non-linear characteristic such as shown in Figure 1. The diagram shows a low-level signal f_1 with the operating point set for two positions, A and B. Observe that the output level of f_1 is much higher when the operating point is set to B than when set to A. Now, examine Figure 2. In this diagram, we sweep the operating point between point A and B with a second high level signal f_0 modulating the amplitude of f_1 . The word "modulating" has been deliberately used here to demonstrate that if f_1 were a carrier frequency and f_0 an audio frequency, we would call it amplitude modulation. The point being made is that amplitude modulation is the same process as mixing, the sum and difference components being the sideband components referred to in modulation.

The next observation to be made concerns the levels of f_1 and f_0 . Signal f_0 is at high level resulting in a high proportion of harmonics if f_0 being generated owing to the curvature of the device characteristic. Signal f_1 is kept low so that the position of the curve used is small and reasonably straight, ensuring that the levels of harmonics from f_1 are low. This is the normal way to operate a receiver mixer where f_1 is the incoming signal and f_0 is the local oscillator. The level at the input is kept low to minimise the generation of intermodulation products from other signal sources and harmonics if f_1 , encouraged by the curvature. This will be discussed further in following paragraphs.

MULTIPLICATION

Referring again to the discussion Figure 2, the

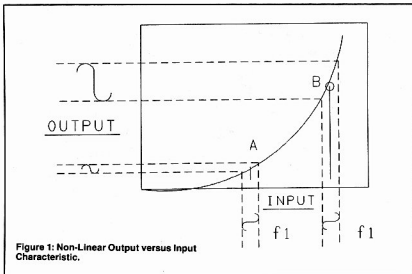


Figure 1: Non-Linear Output versus Input Characteristic.

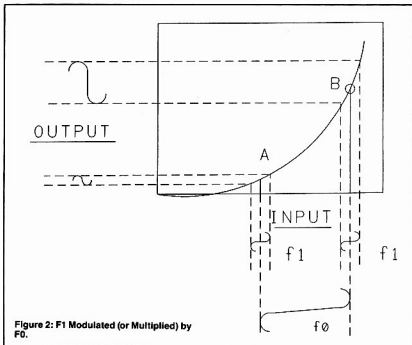


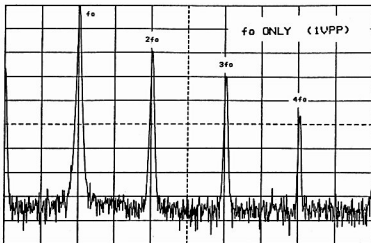
Figure 2: f_1 Modulated (or Multiplied) by f_0 .

process of mixing is mathematically one of multiplication. The instantaneous amplitude of f_1 is multiplied by the instantaneous amplitude of f_0 , hence the resultant components are called products. This is all very confusing as we know that the frequencies formed are equal to sums and differences. It must be understood that it is

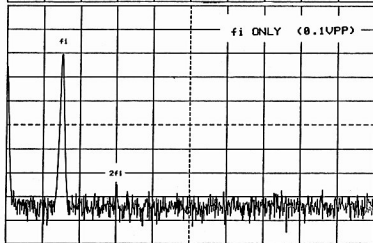
the instantaneous amplitudes which are multiplied, not the frequencies and the phenomenon can be explained by using one of the well-known trigonometric identities:

$$\sin(A) \sin(B) = \frac{1}{2} \cos(A+B) - \frac{1}{2} \cos(A-B) \dots (1)$$

10 DB/DIV



10 DB/DIV



10 DB/DIV

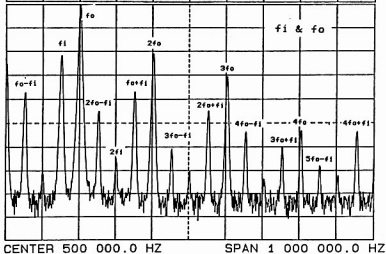


Figure 4: Frequency Spectrum Simple Diode Mixer. (Voltages across diode — $f_0 = 1 \text{ VPP}$, $f_1 = 0.1 \text{ VPP}$).

We can express the instantaneous amplitude of f_1 and f_0 as follows:

$$A_i \sin(2\pi f_1 t) \text{ and } A_o \sin(2\pi f_0 t)$$

where A_i and A_o are their respective amplitudes and t = time.

Multiplying them together by substitution in the identity (1), we get the following:

$$A_i \sin(2\pi f_1 t) A_o \sin(2\pi f_0 t) \\ = \frac{1}{2} A_i A_o [\cos(2\pi t(f_0 f_1)) - \cos(2\pi t(f_0 - f_1))]$$

We can see that two new cosine functions of $(f_0 + f_1)$ and $(f_0 - f_1)$ are normal which represent our sum and difference frequencies. Of course, a cosine wave is the same as a sine wave, with the time scale simply shifted by 90 degrees.

MIXING PRODUCTS

At the output of a mixer, there are many more components than the sum and difference of the input frequencies. To illustrate these on a spectrum analyzer, a simple mixing circuit, using a germanium diode, was set up as shown in Figure 3. Signal f_0 was set at 1 VPP across the diodes, just sufficient to sweep the operating point of the diode over the curvature of its voltage versus current characteristic and signal f_1 was set lower at 0.1 VPP. The two frequencies of 150 kHz and 200 kHz, used for f_1 and f_0 respectively, are of no particular significance other than to illustrate the effects.

Figure 4, three parts, shows the mixer output when either f_0 or f_1 is on its own and then when both are combined for mixing. Observe the high level of harmonics of f_0 compared with f_1 . Harmonic 2f₀ is only 20 dB below f_1 whereas harmonic 2f₁ is 45 dB below f_1 and higher order harmonics of f_1 are even less significant. Observe, also, that the mixer result shows not only

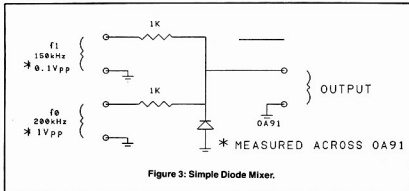


Figure 3: Simple Diode Mixer.

sum and difference products of f_1 and f_0 , but sum and difference products relative to the harmonics of f_0 .

Whether these additional products are of concern depends on how close they are to the sum or difference frequency to be used, their relative level and the sharpness of the tuning or filter system following the mixer. Suppose we were to use $(f_0 + f_1)$ as our output frequency, then our nearest higher order products would be $(2f_0 - f_1)$ and $(3f_0 - f_1)$. Considering their low level, these products would not be much of a problem. What is of concern is the high level of f_0 , 36 dB above $(f_0 + f_1)$ and $2f_0$, adjacent to $(f_0 + f_1)$ and 16 dB above it.

Figure 5 shows what happens when we increase f_1 to the same level as f_0 . The levels of desired products $(f_0 + f_1)$ and $(f_0 - f_1)$ have increased, together with all the other products,

plus new components embracing sum and difference products of the harmonics of f_1 .

Because of the particular frequencies of 200 kHz and 150 kHz, chosen for f_0 and f_1 , some of the harmonics and products work out to be on the same frequency and there are more components than are apparent from Figure 5. (For example, $2f_0$ and $(4f_1 - f_0)$ coincide at 400 kHz). This is illustrated in Figure 6 where f_1 has been shifted down to 115 kHz revealing many more components including $(4f_1 - f_0)$, now on 260 kHz.

Considering again the problem of signal f_0 at the mixer output, 35 dB above the desired output frequency of $(f_0 + f_1)$, one solution is to use a balanced mixer to cancel out f_0 . To demonstrate this a commercial double balanced mixer package, Type CM1, shown in Figure 7, was set up with the same frequencies of 200 kHz for f_0 and 150 kHz for f_1 . The spectrum was recorded as

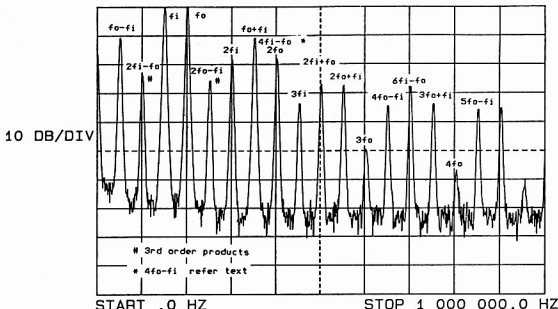


Figure 5: Simple Diode Mixer. (Voltages across diode f_0 = 1 VPP, f_1 = 1 VPP).

10 DB/DIV

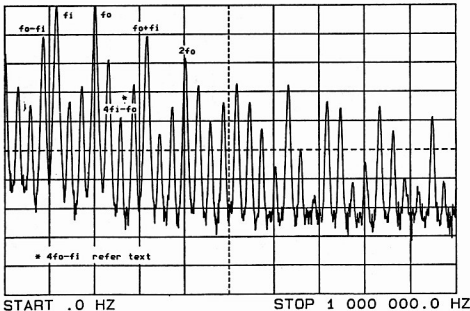


Figure 6: Simple Diode Mixer. (Voltages across diode $f_0 = 1$ VPP; $f_1 = 1$ VPP and f_1 changed to 115 kHz).

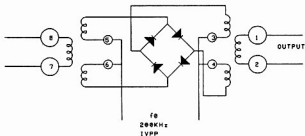


Figure 7: Doubler Balanced Mixer Type-CMI Full Ring.

shown in Figure 6. It can be seen that both the input signals f_1 and f_0 are now 35 dB below the summed frequency ($f_0 + f_1$). Balanced mixers will be discussed further in following paragraphs.

MIXING MODES

Mixers can be classified as those which operate in a continuous non-linear mode, as shown in Figure 2, or as those which operate in the switching mode.

A typical continuous non-linear mode mixer is the dual gate MosFET circuit as illustrated in Figure 9. The MosFET has a square law characteristic which is particularly good for mixing purposes. Because of its high gate impedance it requires little power to drive it and the separate gates provide good isolation between the two signals being mixed.

Most bipolar transistor and vacuum tube type mixers operate in the continuous non-linear

mode. By comparison to the square law of the MosFET, the bipolar transistor and the semiconductor diode have an experimental characteristic and the vacuum tube has a 3/2 power law.

The square law of the MosFET is good because harmonic generation is theoretically limited to second order. This can be demonstrated using another common trigonometric identity:

$$\cos(2A) = 1 - 2\sin^2 A$$

and

$$\sin^2 A = \frac{1}{2}(1 + \cos(2A))$$

Hence, if we square an input component f , expressed as $A\sin(2\pi ft)$ we get:

$$(A\sin(2\pi ft))^2 = \frac{1}{2}A^2(1 + \cos(2\pi 2ft))$$

We now have a frequency $2f$ (the second

harmonic) but no other order harmonics. It also means that in our square law mixer, higher order products are limited to third order ($2f_0 \pm f_1$) and $2f_1 \pm f_0$.

To make a comparison using the exponential law of the bipolar transistor or diode, we can expand an exponential function using the Taylor series:

$$e^x = 1 + x + x^2/2 + x^3/3 + x^4/4 \dots \text{etc.}$$

If we put $x = \sin(2\pi ft)$ we get terms containing the following:

$\sin(2\pi ft)$, $\sin^2(2\pi ft)$, $\sin^3(2\pi ft)$, $\sin^4(2\pi ft)$, and, in fact, all powers of $\sin(2\pi ft)$.

We have seen that sine squared component gives second harmonics, so let us now examine sine cubed. For this, we use a third trigonometric identity.

$$\sin(3A) = 3\sin A - 4\sin^3 A$$

Rearranging the form gives:

$$\sin^3 A = \frac{3}{4}\sin A - \frac{1}{4}\sin(3A)$$

Putting $2\pi ft = A$, we get $\sin^3(2\pi ft)$ from within the sine cubed term of the exponential function implying that a third harmonic is generated.

Without going any further with mathematics we might well predict that a pattern follows in which each incremented power of $\sin(2\pi ft)$ produces a corresponding incremented order of harmonic. Assuming this to be correct, a conclusion can be drawn that the exponential characteristic of the bipolar transistor or semiconductor diode, generates all orders of harmonics, compared with the square law of the MosFET transistor which generates only second harmonics.

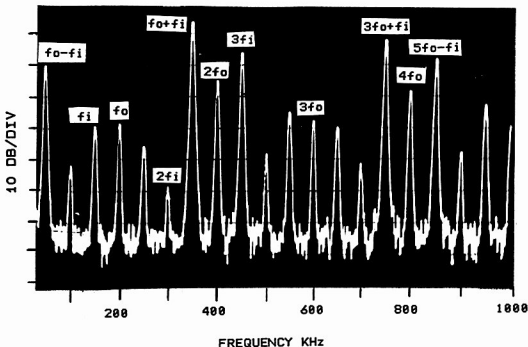


Figure 8: Frequency Spectrum of Double Balanced Mixer.

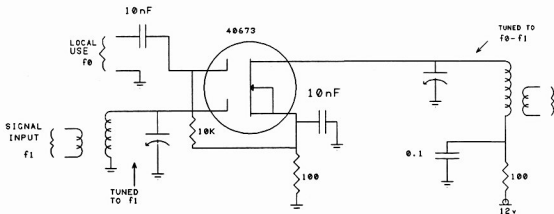


Figure 9: Dual Gate MosFET Mixer Operating in the Continuous non-Linear Mode.

SWITCHING MODE MIXERS

The second classification of mixer to be discussed refers to those which operate in the switching mode. These mixers operate by switching one input signal (f_1) between two states at each half cycle of the second signal (f_0). Figure 7 illustrates a double balanced switching mode mixer in which diodes act as switches. Pairs of diodes are biased on alternately each time the polarity of f_0 reverses and this reverses the phase of f_1 . The switching process is illustrated in Figures 10 and 11. The first

showing f_1 a higher frequency than f_0 and the second showing f_1 lower than f_0 . The signal f_1 is actually multiplied by a square wave of frequency f_0 , an amplitude equal to one and comprising a fundamental and harmonic component as follows:

$$4/\pi(\cos(2\pi f_0 t) - 1/5\cos(2\pi 3f_0 t) + 1/5\cos(2\pi 5f_0 t) \dots \text{etc})$$

that is, f_1 is multiplied by the fundamental of f_0 and all its odd harmonics. (Note that a perfect square wave has no even harmonics).

It is significant that the square wave has only two states, one and minus one, so that to multiply with f_1 it is only necessary to multiply f_1 alternately by one and minus one, that is, reverse the phase of f_1 at each f_0 polarity transition.

This mixer is defined as double balanced because both input signals are balanced out from the output. The reduction of the level of these in the output was previously referred to and illustrated in Figure 8.

Another type of diode switching mixer is the

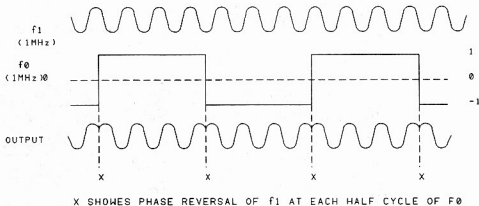


Figure 10: Double Balanced Mixer
Commutation of f_1 by f_0 , f_1 higher than f_0 .

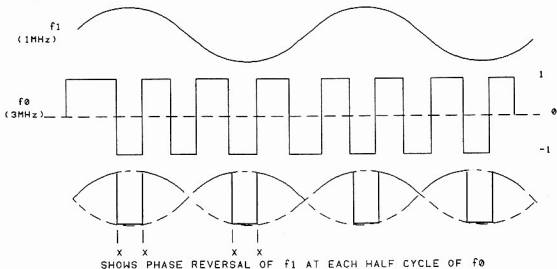


Figure 11: Double Balanced Diode Mixer
Commutation of f_1 by f_0 , f_1 lower than f_0 .

single balanced half ring type shown in Figure 12. In this circuit, the diodes are switched on and off by alternate half cycles of f_0 as shown in Figure 13. In this case we can consider f_1 to be multiplied by a square wave of frequency f_0 and amplitude of one but with a DC offset of amplitude one. Multiplying these together our product is now as follows:

$$A_1 \sin(\pi f_1 t) (1 + \frac{4}{\pi} \cos(2\pi f_0 t) - \frac{4}{3\pi} \cos(4\pi f_0 t) + \dots) \\ = A_1 \sin(\pi f_1 t) + \frac{4A_1}{\pi} \sin(2\pi f_1 t) \cos(2\pi f_0 t) - \frac{4A_1}{3\pi} \sin(4\pi f_1 t) \cos(2\pi f_0 t) + \dots$$

The DC offset is represented by the one and, in multiplying this by $A_1 \sin(2\pi f_1 t)$, representing signal f_1 , we still get the same frequency f_1 , that is, our signal f_1 is not balanced out in this mixer. Switching frequency f_0 is still balanced out however, hence the name single-balanced mixer.

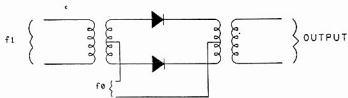
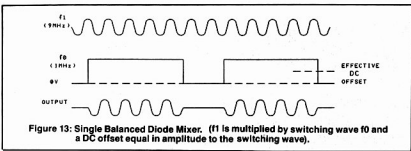


Figure 12: Single Balanced Mixer (Half Ring).

The degree of input signal isolation in the balanced mixer is determined by the accuracy of transformer balance and the degree of matching of the diodes. Before the solid state era, some carrier telephone systems used copper oxide

metal rectifiers. Modern balanced mixer modules, suitable for VHF and UHF, use hot carrier diodes which are characterised by low conduction voltage, low reverse current, low capacitance and very high frequency performance.



Diodes of all types have a current turn-on characteristic and unless driven hard by signal f_0 , will operate in a partial continuous non-linear mode. In the balanced mixer spectrum, shown in Figure 8, even harmonics of f_0 are evident indicating that perfect square wave switching is not taking place.

Diode balanced mixers work very well but have conversion loss rather than gain. They are also low impedance devices and require low source impedance circuits to drive them. Because of these characteristics, active balanced mixers, using bipolar or field effect transistors, are often used. These have conversion gain and can be driven by higher source impedance circuits.

An active balanced mixer, built by the author for use in a transceiver, is shown in Figure 14. In this application, a 4 MHz SSB signal was up-mixed to 17 MHz by beating with a 21 MHz carrier. The spectrum for this mixer in continuous mode with signal f_0 swinging the gate voltage over a large section of the drain current versus gate voltage characteristic. Fine balance of transistor gain is achieved by differential adjustment of drain current with the bias adjustment potentiometer in the source circuit.

Active balanced mixers can also operate in the switching mode by increasing the level of signal f_0 to the point where the output current is switched between zero current and the saturated current state. Whether the operation is continuous non-linear or switching mode is determined by the level f_0 and to some degree the setting of input bias.

UP MIXING AND DOWN MIXING

The question can be asked, when does one use a balanced mixer in preference to a non-balanced type? One answer lies in how difficult it is to remove the reference carrier with tuning or filtering. In the case of Figure 14, the 21 MHz carrier is very close in frequency to the 17 MHz product required and the balanced circuit was built in after some difficulty was experienced with the high residual carrier level at the output.

The same frequency conversion, in reverse, was required in the receiver where conversion was from 17 MHz down to 4 MHz using the same 21 MHz carrier. In this case the 21 MHz is well removed in frequency from 4 MHz and no problem was experienced in using an ordinary dual gate MOSFET mixer similar to Figure 9.

The point being emphasised is that a balanced mixer is more likely to be required when

up mixing, as required in an SSB transmitter, than when down mixing in the matching receiver.

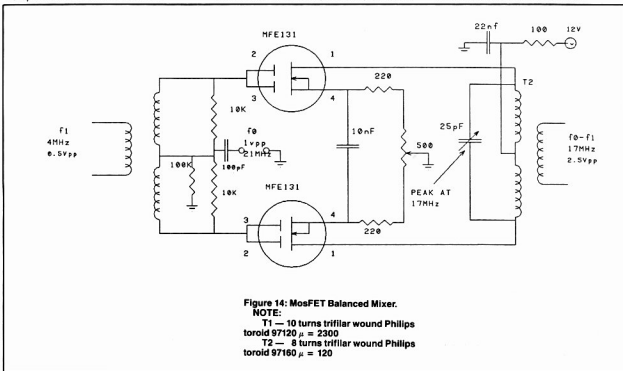
Another use of the balanced mixer is that of an amplitude modulator which generates double sideband suppressed carrier signals. Signal f_1 is then the speech input and the carrier f_0 is balanced out. In this application the mixer is normally called a balanced modulator. Remember that we have already said that mixing and amplitude modulation is the same process. The balanced modulator is the first stage in our single sideband transmitter to generate two sidebands, one of which is removed by a selective filter.

INTERMODULATION PRODUCTS

Because our mixing device operates in a non-linear mode to carry out its function as a mixer, it can also generate intermodulation products from unwanted signals at its input. The products might result from mixing our signal f_1 with some other signal f_2 or from mixing together two entirely different signals f_2 and f_3 . The most troublesome of these are what are called the third order products ($2f_1-f_2$) or ($2f_2-f_1$). These are troublesome because they are normally the closest intermodulation products to our desired signal f_1 .

Suppose our desired signal f_1 is 14.200 MHz and another signal f_2 is present on 14.300 MHz. In this case, our third order products are at 14.100 MHz and 14.400 MHz. Suppose there were a third signal f_3 on 14.400 MHz and we calculate the third order products from f_2 and f_3 , that is ($2f_2-f_3$) and ($2f_3-f_2$). From these we get 14.200 MHz and 14.500 MHz the first of which is the same frequency as our desired signal f_1 and a cause of interference.

Clearly, interference from intermodulation products can be a serious problem and one measure of performance of a mixer is the level of its third order products at the output relative to the desired sum or difference product.



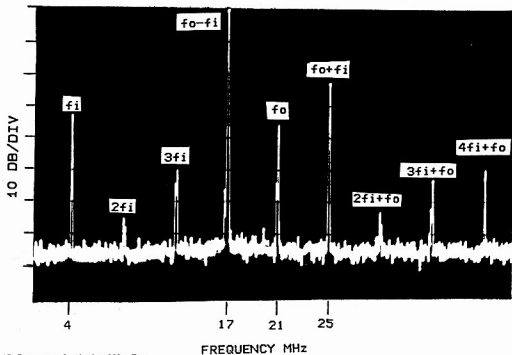


Figure 15: Spectrum Analysis of MosFet Balanced Mixer.

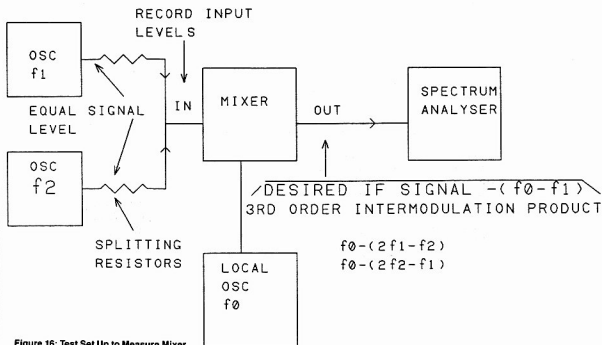


Figure 16: Test Set Up to Measure Mixer Performance.

THIRD ORDER INTERCEPT

It was suggested in earlier paragraphs that to keep intermodulation products low, it was necessary to operate the input signal f_1 at low level. We will now examine the reason for this.

Suppose we feed two sine wave signals of equal amplitude to the input of a non-linear device. We take note of the level and then increase the level by a factor of 3.16, that is 10 dB. Because of the non-linearity, the change in output level will not be the same as the change in input level, however the output can be resolved into components consisting of the two fundamental frequencies f_1 and f_2 and other components which can all be examined separately. The fundamental frequencies must increase linearly otherwise they would not be fundamentals and hence their outputs increase by the same factor as the input (ie 3.16). The other components will follow some other law.

In previous paragraphs we referred to the trigonometry identity $\cos(2A) = 1 - 2\sin^2 A$ and showed that second harmonic components are associated with a sine-squared function, hence we can conclude that second harmonic components $2f_1$ and $2f_2$ follow a square law function of the input level. Of course what we are really interested in, at this stage are the third-order products, the results of multiplying f_1 by f_1 and $2f_1$ by f_2 . The result is, that with f_1 and f_2 equal in amplitude, our third order products ($2f_2 - f_1$) and ($2f_1 - f_2$) follow a cube law relationship with the input level. Tabbing our input change of 3.16 in decibels, we get the following:

Change in input level = $20 \text{ LOG } 3.16 = 10 \text{ dB}$
Change in output at fundamental = $20 \text{ LOG } 3.16 = 10 \text{ dB}$

Change in output of third order products = $20 \text{ LOG } 3.16^3 = 30 \text{ dB}$

Because the third order intermodulation products increase with the cube of the input change, as compared to the linear change for the fundamentals, the higher the signal level input, then the higher the ratio of intermodulation products to fundamental. There is also a theoretical point where the output level of intermodulation products equals the output level of the fundamental. This point is called the Third Order Intercept Point and this is often specified to define the third order intermodulation performance of a mixer.

To measure the intercept point we set up the equipment as shown in Figure 16. Two calibrated signal generators of equal signal level are fed to the inputs of the mixer and the output monitored with a calibrated spectrum analyser. As the device is a mixer, both fundamental and third order products are shifted in frequency by a value f_0 (the local oscillator frequency). In the case of Figure 16, the relevant output components are:

Desired Signal $f_0 - f_1$
Third Order Components $f_0 - (2f_1 - f_2)$
 $f_0 - (2f_2 - f_1)$

Figure 17, shows curves for a 3N140 mixer produced from the test of Figure 16. To carry out the test, the input level is set so that the third order modulation products are the same level as the noise floor. The spectrum analyser is used to separate the various components and measure individual levels. All that has to be recorded is the input and output levels of the desired signal and intermodulation products. It is a simple

matter to extend the curves based on linear law and cube law respectively. By plotting a decibel form, two straight lines of different slopes are formed. The desired signal output increases by 10 dB for a 10 dB increase in input. The third order intermodulation products (IMD) increase 30 dB for a 10 dB increase in input. The curves can be confirmed by recording several different signal levels.

At some point the curves must cross defining the third order intercept. It is emphasised that this point is theoretical and can never be achieved in practice as the mixer would be driven into compression before the point could be reached. Specification of this point is useful because the two curves can be re-established from it using the linear and cube laws.

NOISE LEVEL AND DYNAMIC RANGE

Using the test equipment, Figure 16, another important measurement is the level of the noise floor at the output. As previously discussed, the lower the input signal level the lower the level of intermodulation products. However, the lower the signal level, the lower the signal to noise ratio.

In Figure 17, the noise floor is recorded as 0 dB output and this information, together with levels of signal and intermodulation products, is transferred to a different form in Figure 18. Here we show the signal to noise ratio as a function of input signal level on one curve and the ratio of signal to intermodulation products as a function of input signal level on the other. Observe that there is an optimum operating level where the curves cross and where the output signal is 50 dB above both the noise and the IMD products.

For signal levels below the crossover point, the IMD products are below the noise floor. This is

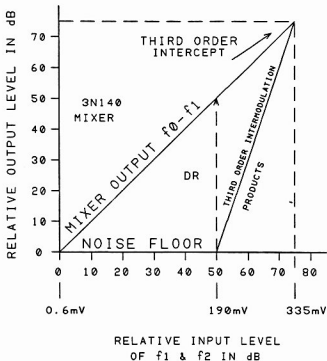


Figure 17: Performance of 3N140 Mixer Showing Third Order Inter-Modulation Intercept.

DR=DYNAMIC RANGE
FOR NO DISCERNABLE
IMD PRODUCTS

TIME DIVISION MULTIPLEXING THE 1920s WAY!

THE BULL TRANSMITTER

A selective system of wireless telegraphy based on mechanical principles, developed by Anders Bull. This device worked on a synchronised system, includes both transmitter and receiver. The transmitter consists of an open-circuit oscillator supplied with energy by the usual transformer or spark coil, which operates through an apparatus termed the disperser. The receiver had, in the original form, an open circuit resonator actuating a number of registers through a collecting mechanism.

The disperser is shown in Figure 1. A is connected by gearing with the motor B, which is in series with a variable resistance for regulating the speed. An electro-magnet, D, automatically controls a disk making a specific number of contacts and sending out a similar and predetermined number of waves or oscillations. When it is desired to send a message, the key L is depressed and closes the circuit, which includes the battery and the electro-magnet 2, which in turn attracts an armature attached to a clutch carrying a pin.

The function of the armature, magnet, and switch is shown more clearly in Figure 2, which is a sectional view of Figure 1. When the armature is drawn to the magnet, 2, disk 3 is released by the clutch, 4, and then revolves at a speed of about five revolutions per second. At every revolution of the disk contact is made by the springs, 6, and the circuit, which includes the battery, 7, and electro-magnet, 8, is closed. The disperser itself consists of 400 steel springs, 9, attached at right angles to the disk and near its periphery. These long vertical springs have their ends free and pass through slots in a stationary upper disk, 10. The springs are thus able to move in a radial direction only. A brass ring forming a groove, 11 (shown in part in Figure 1), is attached to the framework, and guides the springs so that with each revolution of the disk, which occurs once every second, they either slide in the groove, 12, or within its inner circumference.

The bronze arc, 13, takes the place of a section of the brass ring, 11 and has a finger projecting

toward the centre of the disk; as the vertical steel springs come in contact with it they are forced towards the magnet, 14. Attracted by this magnet, the springs then slide along until released at the edge of 15, where they are again drawn into the groove or return to the inner part of the ring by their own elasticity, according to whether the magnet is energised or not.

When it is required to send a dot signal, the key is depressed for less than one-fifth of a second, which is the time required for disk 3 to complete one cycle, and the current flows through the circuit as a single impulse. When transmitting a dash signal, the key is held in contact long enough for disk 3 to revolve a number of times, consequently a corresponding number of electric impulses, at intervals of one-fifth of a second, flow through the circuit, causing the springs to make contact at regular intervals by means of the contact points, 18, and thus closing the circuit in which the battery, 19, and magnet coil, 20, form a part.

As there are a number of these contact points arranged round the frame at prescribed intervals, it is clear that the number of series of electric waves emitted will be equal to the number of contact points, and by varying the distance between these points, any combination or series of waves may be sent out through the medium of the electro-magnet key, 200, battery, 21, spark coil, 22, and oscillator circuit, 23.

The collector is similar to the disperser, except that receptive devices are employed instead of emitting devices in the circuit. Figure 3 is a plan view of a receiver. The coherer is connected in the open circuit resonator in the usual manner, while the relay, 23, in series with a battery, is included in a local circuit with the coherer. The tapper, 24, is in parallel with an auxiliary circuit formed by the armature of the relay in series with the magnet, 25.

For every series of electric waves that impinge upon the resonator system one of the vertical springs slides into the groove, 26, of the ring. The revolving disks of the transmitter and the receiver, or, as they would be termed, disperser and collector, revolve synchronously so that the angular distances of the springs sliding in the grooves will be proportional to the time constant between the series of waves impinging on the aerial.

Since the points are arranged in the same relative positions in both transmitter and receiver and are operated synchronously, contact in both is made simultaneously. The points, 27, are connected in series with the morse printing register, 28. A prearranged series of electric waves will cause the springs to make contact at the same instant when the local collector battery operates the register.

In Bull's experiments one disperser and one collector were used, and these were arranged with three sets of contact points, thus permitting any one of three Morse registers to be operated at will. In Figure 4, three series of waves are shown, by the dotted lines S', S'', and S''', the horizontal line being taken as time and the wave series by the

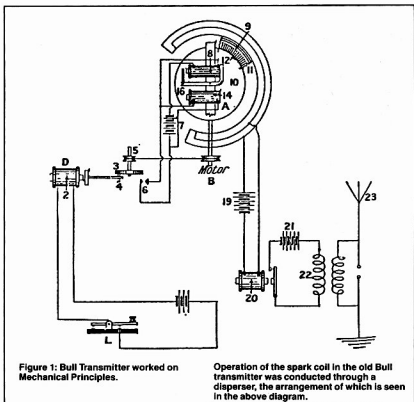


Figure 1: Bull Transmitter worked on Mechanical Principles.

Operation of the spark coil in the old Bull transmitter was conducted through a disperser, the arrangement of which is seen in the above diagram.

Figure 2: Details of Bull Transmitter. Sectional view of Figure 1. From this will be seen more clearly the function of the armature, magnet and switch. The magnet is at 2, disk at 3, and clutch at 4. The disk revolves when the armature is drawn to the magnet.

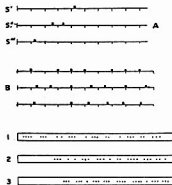
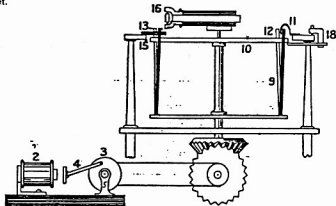


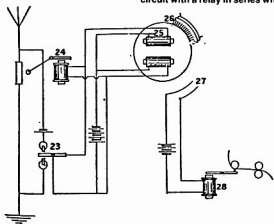
Figure 4: Recording Tape from Bull Receiver.

Three Morse registers were operated in Bull's experiments, and examples of the three methods of recording are given. These represent the result of early experiments to obtain selective reception.

heavy vertical strokes. In Figure 4, B, is represented the way in which the wave series is registered when the key of the transmitter is kept closed; 1m 2m and 3 are the type from three Morse registers operated independently of one another. The transmitters and receivers may be set up in different localities and at varying distances with equally good results. This system was a serious attempt to obtain selective reception.

The above is a reprint of *The Bull Transmitter* from the *Harnsworth Wireless Encyclopedia 1923* contributed by Lloyd Butler VK5BR

Figure 3: Bull Collector Circuit.



Except that, instead of emitting devices, receptive devices are used in the above circuit, the collector is similar to the disperser. A coherer was included in a local circuit with a relay in series with a battery.

This space is reserved for your business card.

ADVERTISE YOURSELF AND/OR YOUR BUSINESS

Amateur Radio has been conducting an advertising feature for those business people who have a message they want to publicise, yet do not want to place a large advertisement.

Send your business card to the Advertising Manager and it will be reproduced in the magazine, one column wide, for \$25.00 per issue.

The Editor reserves the right to refuse any material that he considers unsuitable.

For further details contact:

**The Advertising Manager
PO Box 300,
Caulfield South, Vic. 3162**

HAMADS

PLEASE NOTE: If you are advertising items FOR SALE and WANTED please write **each** on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. **Please do not use scraps of paper.** Please remember your STD code with telephone numbers

Register now & become a member of the:
INTERNATIONAL TRAVEL HOST EXCHANGE

WIA FEDERAL OFFICE
PO Box 300
CAULFIELD SOUTH, Vic. 3162
For further information see page 17, December AR or write to the above address.

BUILD A SWAILER

Its wails can help you tune up your rig and antenna tuner.

The SWAILER is a tune-up aid for blind amateurs that provides an audible indication of RF output and indicates SWR, offering White Cane Operators a simple method of operating antenna tuners.

Operation

As an RF output indicator, the Swailer functions like many existing audible relative power indicators, in that the transmitter is tuned up to obtain that highest possible tonal pitch from the built-in speaker, without losing the tone altogether.

When maximum output has been achieved, press the SWR push button S2. A change in tone indicates the presence of a reflected wave. With the button depressed, adjust the antenna tuner until the tonal pitch is closer to the original tone. Alternatively touch up the transmitter output (with the button released) and the antenna tuner (with the button depressed) until the two tones are as nearly matched as possible. Identical tones indicate an SWR of 1:1.

Adjust R4 to establish a comfortable tonal range. The setting of R4 is an operating convenience only, and has no effect on the function of the system.

For initial setup, install an additional SWR meter ahead of the tuner to check things out, because the SWR button on the Swailer, being normally to ground, may ground the meter in the pickup unit when switched to read reflected power. When everything has been checked out, remove the temporary meter, and leave the meter in the pickup unit switched to the forward position.

Circuit Description

U1 (Figures 1 and 2) is a differential amplifier driving U2, a voltage-to-audio frequency converter. Q1, Q2 and Q3 function as a current mirror, necessary for the unit to produce a usable range of audible tones.

U1 amplifies the difference between input 3 (Forward voltage) and input 2 (Zero volts when S2

is normally closed, or reflected voltage when S2 is held open). Thus, when all reflected power has been tuned out, the output of U1 will be the same with S2 open as with S2 closed, resulting in identical tones being produced by U2.

R4 is a 'set-and-forget' control to obtain a workable tonal range.

Input Signals

The Swailer requires samples of both the forward and reflected DC voltages from the transmission line between the rig and antenna tuner. If there is room in the SWR meter, the Swailer could be built in.

Install a 1/4 inch stereo jack in the SWR bridge. Ground the sleeve, connect the tip contact to the reflected power diode, meter side, the third contact to the forward power diode, meter side.

Make up a cable from two-wire shielded cable with a 1/4 inch stereo plug on each end to connect the Swailer to the SWR bridge or tuner.

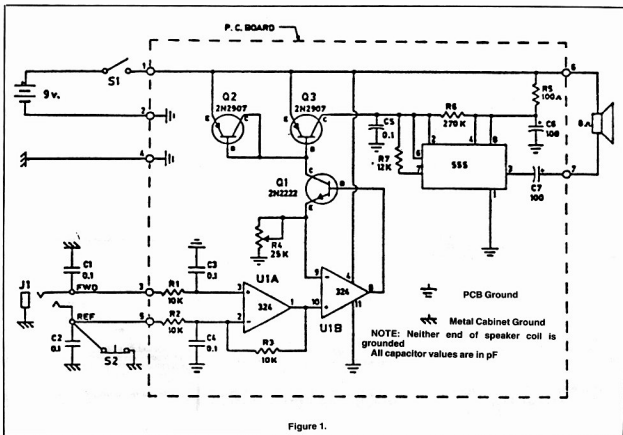


Figure 1.

WIRELESS INSTITUTE OF AUSTRALIA

PAPER 6 — CONCLUSIONS AND RECOMMENDATIONS

by The Future of Amateur Radio Working Party
The Working Party Membership includes:

Ron Henderson VK1RX
Gordon Bracewell VK3XX
John Aarse VK4QA
Stephen Phillips VK3JY

BACKGROUND

The Future of Amateur Radio Working Party was set up by the 1986 Federal Convention and directed by the Executive to, amongst other things, report on "the operating and technical requirements of amateur radio in the near future (next five years) and more distant future (but to say 15 years)."

Following the 1987 Federal Convention where guidance was given to the Executive on the Future of Amateur Radio, the Executive further requested the Working Party "to produce a number of discussion papers, coupled with a general review of licensing grades and operating privileges existing in the Amateur Radio Service". The Working Party's terms of reference are attached in Appendix 1.

The Working Party has produced five discussion papers to date, namely:

The Future of Amateur Radio (AR, September 1986)

Frequency Bands and Emissions (AR, November 1986)

A Proposal to Restructure Amateur Radio Licensing (AR, December 1987)

A Synopsis of Members Comments (AR, March 1988)

These papers have explored many facets of amateur radio and have provided the Working Party with a basis for this sixth and final paper containing the aggregated conclusions and specific recommendations.

AIM

To present concise conclusions and a series of recommendations for consideration and adoption by Divisions at the 1988 Federal Convention.

WORKING PARTY CONSIDERATIONS

Part way through its deliberations, the Working Party was faced with criticism in another amateur radio publication, that it had not examined the basic reason for existence of the Amateur Radio Service. The Working Party had agreed earlier that such examination of grass roots was not necessary, hence there are implied assumptions in its deliberations.

It is useful to set down now those assumptions which can be interpreted as:

- There are no major disagreements with the aims and objectives of the Amateur Radio Service.
- Being a part time interest activity, the qualifications to be a radio amateur should be pitched low enough to permit their achievement by the average enthusiast after a short period of instruction. Qualifications may be graded with associated graded privileges.

c. The amateur requires small band segments spread across the whole frequency spectrum from long wave to microwave. Spectrum allocations must permit the commonly used modes to be employed without undue congestion.

d. Amateur radio will attract people from all walks of life and all age groups. However, financial constraints and available leisure time are recognised as recruitment influences.

e. Radio amateurs generally wish to practice their interests free from constraints, obstructions, bureaucracy, harassment and nuisance. They will usually give a little of their free time to administration of their hobby.

The Working Party's approach has been to identify points which need to be considered and group them up into like aspects. Papers have been produced on those aspects and an open style adopted with all papers staffed to all Working Party members, revised and then published in *Amateur Radio* magazine for comment from the membership of the Institute.

Paper 5 — A Synopsis of Members Comments was published to acquaint members of frequently recurring comments and re-assure them of incorporation of their contributions. These collective views have been used to modify the conclusions and recommendations of the earlier papers for incorporation in this final summary paper.

Incidental Actions by the Working Party

The Working Party was called upon by the Executive to produce a report on the surveys conducted by the Divisions into the "Novices on Two Metres" topic (AR, February 1988). That action was invaluable to the Working Party for the surveys were generally cast wider than just the prime issue under consideration and contributed significant membership opinion.

Feedback from Members

The feedback arising from members, though small at first appearance, is now recognised by the Working Party to be realistic. The Working Party's actions have been responsive to previously expressed thoughts and opinions, that is we have been on the whole reactive rather than innovative. Hence, seen in the broad, the membership input has been considerable, but disguised by being spread out over almost two years and directed towards specific topics of concern.

We trust members reactions to this final paper will arise in the form of opinions expressed to Federal Councillors in preparation for the Federal Convention in April 1988.

CONCLUSIONS

The Working Party has finished its work as directed and concluded that the general feeling from the membership is one of a need for change.

The Working Party has published its approach and solicited comments from members through their Federal Councillors. Ample time has been allowed for members inputs.

We believe there will be little change in amateur frequency allocations over the next 15 years. New bands are unlikely except perhaps at VLF or to replace existing temporary UHF allocations. A matter for consideration by the WIA is the trade-off between wide shared allocations, or narrow exclusive segments at UHF.

A range of options is open to the Amateur Radio Service, extending from a highly regulated, highly qualified, elitist extreme to a virtual no qualification scheme, not unlike CB.

Arising from consideration of options, a detailed amateur radio licence restructuring proposal has been defined. This satisfies all perceived constraining factors in that it is simple, has a minimum number of grades, yet progression is clear and substantial incentives are provided for upgrading.

The Working Party's papers have provided little depth debate. Members responses have, to a large extent, bypassed Divisions and Federal Councillors suggesting a lack of awareness of the WIA's method of government.

The "Novices on Two Metres" issue provided the greatest response from Divisions with about 24 percent of WIA membership responding by one means or another. The consensus was to seek portions of the two metre and 70 centimetre band for novice use.

On the whole there is a widespread desire for a licence system restructuring without creating a lower grade than novice or a grade above unrestricted. Within these bounds there is strong support for enhancing the novice licence grade and creating a common band for all licence classes.

RECOMMENDATIONS

It is recommended the WIA adopt the following:

- Note these recommendations are based upon members opinions and comments as expressed directly or indirectly to the Working Party.
- Agree the Amateur Radio Service must begin detailed planning soon, both nationally and internationally for WARC 92 and face the IARU Region 3 Conference in Seoul with definite proposals.
- Note the Australian radio amateur is permitted a wide range of emission modes, specified on his licence as permitted occupied bandwidths. This approach permits considerable flexibility for the user, both now and in the future and agree this should be retained. Furthermore, note there is a direct relationship between the demonstrated theoretical knowledge level of an amateur licensee and the complexity of authorised emission modes.

4. Agree the WIA initiate no change to the amateur Morse code proficiency requirements until after WARC 92 when the outcome of that Conference may be implemented.
5. Endorse the WIA policy to press activity for an amateur licence currency in excess of one year with commensurately reduced fees. The longer term goal is an internationally accepted licence along the lines of the European CEPT scheme.
6. Agree the WIA position for frequency allocations for WARC 92 and convey that position to IARU members at the Region 3 Conference at Seoul 1988.
7. Agree the Japan/Australia reciprocal licence agreement be examined for possible bias against Australian amateurs, more specifically the amateur novices and, if confirmed, redress sought.
8. Agree the formation of WIA/DOTC joint committees be encouraged to facilitate communications with the Department and promote self-regulation of amateur radio.
9. Endorse the licence option for an additional entry point within the existing novice to unlimited licence range and represent it to DOTC.
10. Endorse the preferred option for amateur licence restructuring and seek its implementation at the earliest opportunity by DOTC.
11. Endorse the editorial policy of *Amateur Radio* magazine in publishing the current series of home construction and simple projects which are satisfying an expressed demand.
12. Agree the matter of WIA channels of communication needs examination and perhaps reorganisation if the current membership to Division and/or Division to Federal system is confirmed cumbersome and inefficient.
13. Note the Working Party has completed its duties as directed and task it with implementing these recommendations.

February 1988

APPENDIX 1 — TERMS OF REFERENCE

- 1 The Future of Amateur Radio Working Party (FARWP) is appointed as a committee of the Federal Executive in response to 1986 Federal Convention motions to report to the 1987 Federal Convention on the Future of Amateur Radio.
- 2 a) the operating and technical requirements of amateur radio in the near future (next five years) and more distant future (out to say 15 years);
b) the qualification for amateur licences, having regard to:
i. the need to maintain a standard, identifying the standard seen to be appropriate, and
ii. the desirability of establishing a standard appropriate to attract new entrants, identifying a standard and the factors seen as relevant thereto.
c) the frequency bands, emission types and powers to be associated with the Certificates of Proficiency above (ie "licence conditions").
- 3 The following assumptions should be examined, together with any other matters seen to be relevant —
a) Australia is bound by International agreements, in particular the ITU Radio Regulations, particularly in relation to frequency bands.
b) available frequencies are as determined at WARC 79 and duly modified in the Australian Table of Frequency Allocations, and will be modified by future conferences.
c) current government attitudes on "the user pays" principle and DOTC actions on self-regulation and devolution of examinations.
- 4 FARWP is to be composed of —
Working Party Chairman — resident in Victoria

- Up to four Working Party members — resident in Victoria
A member of Federal Executive
The Federal President (ex officio)
Six Communicating members, one appointed by each Division
- 5 FARWP will report progress monthly to Federal Executive through their FE member. The final report of the WP will be provided to Federal Executive and Federal Councillors in time for publication in the March 1987 edition of *Amateur Radio* (AR deadline date — 19/1/1987). The Report will be received and recommendations adopted, as appropriate, at the 1987 Federal Convention (May 1-3, 1987). The Working Party will be dissolved after reporting.
 - 6 The following references are applicable:
a) Federal Convention motions:
86.15.02 — Future AR
86.12.01 — Six Metres
86.09.01/1 76.20.02 77A 76.08/2 — Novices
82/09/21 07 — Policy Statements
80.09.02/1 — Common Band
82.091 — Forward Planning
b) *Amateur Radio* articles:
February 1986, page 14 — Amateur Radio
— Future Direction by J Linton and R Harrison
August 1986, page 27 — Novice Licensing into the 21st Century by G Bracewell
c) Overseas Articles:
ARRL proposals to FCC re novice licensing QST
DOC Canada licensing revisions proposals QST December 1985, page 75. CRR-L-CARF Joint Comments
d) DOC Communications:
Proposals re novice frequencies
Proposals re examinations

TOPICAL TECHNICALITIES — 3

Lindsay Lawless VK3ANJ

Box 112, Lakes Entrance, Vic. 3909

Please note: Substitute pi for f.

Technical name dropping among radio amateurs has always been popular and I don't mind that, but when there are many names like me the same thing I get very confused. Take for example these:

- 'Capture area' (very popular,
- 'Effective area',
- 'Absorption cross section' and
- 'Effective aperture'.

Those terms are all used when referring to the effectiveness of a receiving aerial and I believe they have the same meaning. I have heard a mobile antenna salesman claiming superior 'capture area' for his product and recently a technical author claimed that his favoured aerial had a capture area which was independent of wavelength. Both, I believe, are misrepresenting the facts.

I prefer 'absorption cross-section' because of the definition; Absorption cross section' is the area from which energy would have to be extracted from an incident radiation to equal the energy removed and absorbed in the aerial load. It is very important to include the words 'absorbed in the aerial load' because a

receiving aerial situated in a radio wave field delivers power to a receiver (load) and its own radiation resistance, ie portion is absorbed and portion re-radiated. The portion absorbed by the receiver is the important bit and to make this maximum it is necessary to 'match' the load and the radiation resistance, when these are equal half the power input is re-radiated and half absorbed. The following is a quantitative derivation.

The field intensity of a radio wave is specified as 0 watts per square metre. If the source is isotropic (radiates equally in all directions) with a total radiated power output of P, watts the intensity at the surface of an enclosing sphere with a large radius r is,

$$\phi = P/4\pi r^2 \text{ watts per square metre}$$

A receiving aerial located in this field will absorb P_a watts and

$$P_a = A_a \phi = P A_a / 4\pi r^2 \text{ watts therefore}$$

$$A_a = 4\pi r^2 P_a / P, \text{ square metres}$$

A_a is the absorption cross section (area) or any of those other names.

Receiving aerials also have gain G and it can be shown that G and A_a are related

$$A_{a(\text{max})} = G \lambda^2 / 4\pi$$

G for a halfwave dipole is 1.64 therefore

$$A_a = 1.64 \lambda^2 / 4\pi = 0.13 \lambda^2 \text{ square metres}$$

when the dipole is oriented for maximum reception.

Note: the general expression for A_a includes spherical co-ordinate factors to allow for orientation.

Obviously a dipole end on to the transmitter, for example, will have a much smaller absorption cross section than when oriented for maximum.

The concept of area as a measure of an aerial's effectiveness as a receiving aerial originates with the early work of physicists who sought similarities with their existing concepts. A surface exposed to radiant heat, for example, absorbs energy proportionally to its projected area, it is reasonable to assume that aerials might also have an effective absorption area, but it transpires that this area is not the physical area. A halfwave 30 MHz dipole, for example, has an absorption cross section of 13 square metres, its actual area is usually much less than this. There is a radiant heat analogy: an opaque surface in the path of radiant heat will reach an equilibrium state where the total of energy absorbed and radiated equals the incident energy. Similar to aerials, good absorbers are also good radiators, the best absorb the same amount as they radiate.

1988 FEDERAL CONVENTION AGENDA ITEMS

MOTION PROPOSED BY VK1: That this Council review existing policy relating to amateur radio bands and produce an updated and concise policy in preparation for the IARU Region 3 Conference in Seoul 1988.

PROPOSER'S COMMENTS: The Future of Amateur Radio Working Party's Paper 2, Frequency Bands and Emissions, provided a resume of the current situation and extant WIA policy with regard to amateur frequency bands. These matters are summarised in the accompanying table.

PREAMBLE: In the present structure of the Wireless Institute, the Executive can become very remote from the membership as a whole. Where a group feel that the Council or the Executive are in error in a decision, there should be a means of calling for a poll of all Divisional members. Conducting such a poll through the normal process of motions on notice to each Division is hopelessly unwieldy, and therefore the only way to conduct such a poll is through the Federal body. The following proposal is intended to apply to matters directly affecting the hobby, in particular, proposed changes to the regulations.

MOTION PROPOSED BY VK3: That the Executive prepare a motion for a special resolution to amend the Federal Constitution or prepare a motion of policy to embody the intent of the following points:

1. Any two Federal Councillors may call for a poll on any proposed motion or resolution of the Council or any decision of the Executive the result of which directly affects the hobby of amateur radio.
2. The details of the proposed poll should be sent in writing to the Federal Secretary.
3. On receiving such a request any action on any move in the Federal body relating to the intent of the poll shall immediately cease.
4. At the earliest possible opportunity the details of the poll shall either be posted to all members or be placed in the national magazine as an insert.
5. The maximum time lapse between the proposal being received by the Secretary will be based on the following — the time between receiving the proposal and the next publication of the magazine plus two weeks (two weeks for preparation) plus one month to receive the results of the poll. (The intent of this proposed period is to allow a reasonable time to carry out the necessary administrative work.)
6. Any Division may appoint scrutineers to supervise the counting.
7. If the poll included more than one alternative, the voting will be preferential.
8. The results of the poll will be indicated by a majority vote for a particular item taken as a majority of the total number of persons voting after distribution of preferences. (Since the vote is possibly intended to over-ride a Federal decision, a safeguard could be built into the procedure by requiring a two-thirds majority for a final decision.)
9. The result of the poll will be binding on the Federal body and will supersede any resolution or intent directly relevant, but not yet finalised.

10. If the Federal body does not prepare the survey within the time required, the originating Division may issue the survey and all costs will be charged to the Federal body.

MOTION PROPOSED BY VK3: Restructure of the WIA Federal body.

PROPOSER'S COMMENTS: a. That the Federal Executive take immediate action to conduct a referendum to ascertain the individual views of the members of all Divisions on restructuring the Institute and that the appropriate form/s be inserted in AR magazine together with an addressed reply-paid envelope.

b. Proposed Restructure:

- i. A new National Organisation be constituted and the Divisions be disbanded.
- ii. The National Organisation, have as members, both individuals and affiliated clubs and these members and clubs should be represented by a "Committee of Management".
- iii. The "Committee of Management" should be responsible for the direction of salaried staff to perform all functions associated with membership services.
- iv. All members should have equal voting rights.

c. If the survey result indicates that a majority is in favour of the proposal, immediate action should be taken to restructure the WIA.

MOTION PROPOSED BY VK3: That the six metre FM Repeater Band Plan be expanded to include two general use channels for repeaters and that these channels are available in each State.

PROPOSER'S COMMENTS: State band planning on six metres is being delayed because exclusive state channels are reserved for large service area repeaters, thus not allowing groups to develop small local service area repeaters.

SUGGESTED BAND PLAN REPEATERS

State	Status	Input MHz	Output MHz	SIMPLEX
ALL STATES		52.550	53.550	
SECONDARY				
USE		52.575	53.575	
VK8	Prim	52.600	53.600	53.400
VK2	Sec	52.625	53.625	53.425
VK7	Prim	52.650	53.650	53.450
VK3	Sec	52.675	53.675	53.475
VK1	Prim	52.700	53.700	53.500
National				
VK4	Sec	53.725	53.725	53.525
calling				
VK5	Prim	52.750	53.750	53.550
VK8	Sec	52.755	53.755	53.575
VK6	Prim	52.800	53.800	
VK7	Sec	52.825	53.825	
VK2	Prim	52.850	53.850	
VK1	Sec	52.875	53.875	
VK3	Prim	52.900	53.900	
VK5	Sec	52.925	53.925	
VK4	Prim	52.950	53.950	
VK6	Sec	52.975	53.975	

MOTION PROPOSED BY VK3: That the agenda for the WIA Federal Convention be published in Amateur Radio magazine prior to the Convention.

PROPOSER'S COMMENTS: The publication of the Federal Convention agenda will allow:

1. viewing and discussion of Federal Convention agenda items from various States by WIA members

2. WIA members to have an input to the Federal Convention items via their Federal Councillor so that the opinions expressed at the Federal Convention are those of the members

3. WIA members to keep abreast of proposed changes to WIA policy.

MOTION PROPOSED BY VK3: That within 90 days after the Federal Convention that the decisions made at the Federal Convention be published in Amateur Radio magazine.

PROPOSER'S COMMENTS: The publication, in Amateur Radio magazine, of the results of the motions moved at the Federal Convention will allow WIA members and others to:

1. be informed of changes to WIA policy
2. promote discussion which will allow WIA members to formulate motions for future Federal Conventions thus allowing the members of the WIA to guide the direction of WIA policy.

MOTION: That in preparing the WIA submission for the 1992 WARC, the WIA strive to preserve all existing band allocations, the existing amateur position within the bands and to enhance the amateur band position with regard to status within the bands.

PROPOSER'S COMMENTS: 1. With the exception of the 80 metre band that the WIA position at the next WARC be one of consolidation within the bands in preference to extension.

2. That where appropriate amateur secondary service and/or temporary status be upgraded to primary user status.

MOTION PROPOSED BY FEDERAL EXECUTIVE: That Divisions present their recruiting plans aimed to raise WIA membership by 500 in 1988 and a co-ordinated plan be adopted.

ANTENNA DESIGN IN AR MAGAZINE FIRST

A technical article "Mis-matching for Extended Bandwidth" by Bill McLeod VK3MI, in AR magazine, April 1986, has been picked up by overseas publications.

The article tackled the problem of obtaining an acceptable SWR over the wider 3.5 MHz band (3500 to 4000 kHz) available in some parts of the world.

The novel idea of deliberately mis-matching a 50 ohm dipole by leading it with 72 ohm cable and then providing capacitance compensation attracted attention in the UK and USA.

The RSGB journal, *Radio Communication* was quick to run with an adaption of the article in its June 1986 edition. *Ham Radio* magazine came out with its version in October 1987.

Both magazines gave credit to Bill for his antenna design and mentioned it had been in the journal of the Wireless Institute of Australia.

Congratulations Bill, you can rightly be proud of your article getting international recognition.

Table 1 — WARC 92 Planning

BAND	PREWARC 79 GUIDANCE	IARU GUIDANCE
VLF	Nil	Region 3 — left to national societies initiatives
190 kHz	1984 — seek a narrow band or spot frequency	
1.8 MHz	Extend band to 1.8-2.0 MHz	Region 3 — Raise 1.85-2.00 MHz to primary equally shared status
(1.8-1.825 amateur primary 1.825-1.875 secondary)		
3.5 MHz	Seek 3.5-4.0 MHz, revised in 1981 to 3.5-3.9 MHz	Region 3 — Raise 3.750-4.000 to primary equally shared status
(3.5-3.7 amateur primary 3.794-3.800 secondary)		
7 MHz	Seek 7.0-7.5 and eliminate sharing.	Region 3 — 7.0-7.15 amateur exclusive and 7.15-7.3 MHz amateur primary equally shared.
(7.0-7.1 amateur and amateur satellite primary 7.1-7.3 amateur secondary)	Revised in 1982 to 7.0-7.3 MHz	
10 MHz	Seek an allocation	Region 3 — Extend to 10.3 on equally shared status
(10.10-10.15 MHz secondary)		
14 MHz	Seek extension to 14.5 MHz	Region 3 — Seek extension to 14.400 MHz amateur exclusive
(14.00-14.25 MHz amateur and amateur satellite primary, 14.25-14.35 MHz amateur primary)		
18 MHz	Seek an allocation	Region 3 — Seek extension to 18.3 MHz amateur exclusive
(18.068-18.168 MHz amateur and amateur satellite secondary, primary July 1, 1989)		
21 MHz	Seek extension to 21.5 MHz	Region 3 — Seek extension to 21.5 MHz amateur exclusive
(21.00-21.45 MHz amateur and amateur satellite primary)		
24 MHz	Seek an allocation	Region 3 — Seek extension down to 24.8 MHz amateur exclusive
(24.89-24.99 MHz amateur and amateur satellite secondary, primary July 1, 1989)		
28 MHz	Nil	Region 3 — Seek extension to 30.0 MHz amateur exclusive
(28.0-29.7 MHz amateur and amateur satellite primary)		
50 MHz	Seek return of 50-52 MHz	Region 3 — Seek 50-54 MHz amateur exclusive
(50-52 MHz secondary, 52-54 MHz amateur primary)		
144 MHz	Nil	Region 3 — Seek 144-148 MHz amateur exclusive world-wide
(144-148 MHz amateur primary, 144-148 MHz amateur satellite primary)		
220 MHz (no Australian allocation)	Seek an allocation	Region 3 — Nil
420 MHz	Nil	Region 3 — Satellite segment 435-440 MHz amateur exclusive, remainder amateur equally shared status

(420-450 MHz amateur secondary, 435-438 MHz amateur satellite secondary)		
576	Nil	Region 3 — nil, not a regional allocation
(576-585 MHz amateur primary)	1984 — Seek a permanent ATV channel	
900 MHz	Nil	Region 3 — Seek an exclusive amateur segment around 902-928 MHz
(No Australian allocation)		
1296 MHz (1240-1300 MHz amateur secondary, 1260-1270 MHz amateur satellite secondary)	Nil	Region 3 — Nil
2300 MHz	Nil	Region 3 — Seek amateur primary status for 2400-2450 MHz
(2300-2450 MHz amateur secondary, 2400-2450 MHz amateur satellite secondary)		
3300 MHz	Nil	Region 3 — Seek amateur primary 3400-3420 MHz and primary equal shared 3420-2475 MHz
3300-3600 MHz amateur secondary, 3400-3410 MHz amateur satellite secondary)		
5650 MHz	Nil	Region 3 — Seek primary 5640-5670 MHz and primary equal shared 5830-5850 MHz
(5650-5850 MHz amateur secondary, 5650-5670 MHz amateur satellite secondary)		
10 GHz	Nil	Region 3 — Seek amateur primary status 10.45-10.50 GHz
(10.0-10.5 GHz amateur secondary, 10.45-10.50 GHz amateur satellite secondary)		
24 GHz	Nil	Region 3 — Seek amateur primary exclusive 24.00-24.05 GHz
(24.00-24.05 GHz amateur and amateur satellite primary, 24.05-24.25 GHz amateur secondary)		
76 GHz	Nil	Region 3 — Seek amateur primary equal shared 76-81 GHz
(75.5-76.0 GHz amateur and amateur satellite primary, 76-81 GHz amateur secondary)		
120 GHz	Nil	Region 3 — Seek amateur primary exclusive 119-121 GHz
(119.98-120.02 GHz amateur secondary)		
150 GHz	Nil	Region 3 — Seek primary amateur equally shared 144-149 GHz
142-144 GHz amateur and amateur satellite primary, 144-149 GHz amateur and amateur satellite secondary)		
240 GHz	Nil	Region 3 — Seek primary amateur equally shared 241-248 GHz
(241-248 GHz amateur and amateur satellite secondary, 248-250 GHz amateur and amateur satellite primary)		



VHF UHF — an expanding world

Eric Jamieson VK5LP

8 West Terrace, Meningie, SA. 5264

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR TIME BEACONS

FREQUENCY	CALL SIGN	LOCATION
50 005	H44HR	Honara
50 005	ZS2SX	South Africa
50 010	JA2IGY	Mie
50 022	Z56PW	Pretoria
50 050	Z58DN	South Africa
50 075	V56SX	Hong Kong
50 075	Z54SA	South Africa
51 020	Z1UHF	Auckland
52 013	Z29BL	Port Moresby
52 100	ZK2SIX	Nice
52 200	VK9VF	Darwin
52 250	Z1VHM	Manawatu
52 320	VK8RTT	Wickham
52 325	VK2RHY	Newcastle
52 330	VK3RGG	Geelong
52 345	VK4ABP	Longreach
52 350	VK6RTU	Kalgoorlie
52 370	VK7RST	Hobart
52 420	VK2RSY	Sydney
52 425	VK2RSG	Gunnedah
52 432	VK0MA	Mawson
52 435	VK3RMV	Hamilton
52 440	VK4RTL	Townsville
52 445	VK4RIK	Cairns
52 450	VK5VF	Melbourne
52 460	VK6RPH	Perth
52 465	VK6RTW	Albany
52 470	VK7RNT	Launceston
52 485	VK8RAS	Alice Springs
52 510	ZL2MHF	Mount Cinner
144 022	VK6RBS	Busselton
144 400	VK4RTT	Mount Mowbray
144 410	VK1ACC	Canberra
144 420	VK2RSY	Sydney
144 430	VK3RGT	Glen Waverley
144 445	VK4RIK	Cairns
144 445	VK4RTL	Townsville
144 455	VK6RTW	Albany
144 470	VK7RMC	Launceston
144 480	VK9VF	Darwin
144 485	VK8RAS	Alice Springs
144 550	VK5RSE	Mount Gambier
144 565	VK6RPH	Port Hedland
144 600	VK8RTT	Wickham
144 800	VK5VF	Mount Lofy
144 850	VK3RCH	Sydney
144 950	VK3RCH	Melbourne
145 000	VK6RPH	Perth
432 066	VK6RBS	Busselton
432 160	VK6RPH	Nedlands
432 110	VK1RBC	Canberra
432 420	VK2RSY	Sydney
432 440	VK4RBS	Brisbane
432 445	VK4RIK	Cairns
432 445	VK4RTL	Townsville
432 450	VK3RAI	Macleod
432 535	VK3RMB	Mount Buninyong
432 540	VK4RAR	Rockhampton
1296 198	VK6RBS	Busselton
1296 420	VK2RSY	Sydney
1296 445	VK4RIK	Cairns
1296 480	VK6RPH	Nedlands
10300 000	VK6RPF	Rockystrone
10445 000	VK4RIK	Cairns

The only change to the beacon structure this month is the change in frequency of VK0MA, at Mawson. A letter from Mark VK0AQ, says the rise in summer temperatures (!) have not altered the frequency as he had hoped. He said the beacon has been very reliable with very little time off the air.

If Mark's plans work out as expected, he should be on board ship making his way home as I prepare these notes (17/2), after his second stint at Mawson. Mark advised me of this during a recent radio telephone call. Also coming home with him should be David VK0CK, who has been spending his time at Davis Base.

AROUND THE PACIFIC

Neville VK4ZNC, (ex VK9LC, ZK2AZ, 5W1GA, 3D2AR, C21NI, T30DD, T20AR), has written with an outline of his last Pacific Expedition, and says:

"On 13/11/87, I flew from Brisbane to Sydney where I caught the plane to Nauru C21. On arrival at about 10 pm that night, I checked in at the Menen Hotel which is one of the two hotels on the island.

"The next day I met Reuben Kun C21RK, who is the Minister for Health and Education, and he took me around to the other side of the island to show me their club house. Reuben is the highest authority as far as radio licensing is concerned, and he explained they do not issue temporary amateur licenses to visitors to the island. However, he said I was quite welcome to use the club call sign, C21NI, on all bands, but he would prefer me to operate from the club house.

"A couple of days later when the time came to erect the six metre beam, Reuben advised me he would send someone around to help me. He wasn't kidding. Three men and a cherry picker arrived just to erect my small beam!

"During my two week stay on Nauru as C21NI, I worked 63 JAs most at good strength on 50 MHz. The openings were on 21/11, 22/11 and 23/11 around 0500 each day. Nothing was heard from VK or elsewhere.

"The following stations are active on Nauru: Ken C21KH, Frank C21FS (most active), Reuben C21RK, Det C21BD, Dumas C21DD (mainly CV), Vassal C21VG, and Vince C21VC, all operating on the HF bands.

"On 21/11, I left for Tarawa T30, where I stayed at the Kiribati Hotel on the atoll of Betio. There is one other hotel, the Otintai, which is closer to the airport, but to erect an antenna there would be somewhat difficult. A licence is easy to obtain in Kiribati (pronounced Kiribas) and, as in most of the other Pacific Islands, a limited licence is given full operating privileges on all bands.

"Unfortunately, I had no contacts on six metres from Tarawa as T30DD, but I did hear Channel O, Brisbane peaking to S9 on 9/12 at 0500. It started coming in at 0252 and did not go out until 0530. Despite constant calling with my 100 watt amplifier and five element Yagi at 28 feet, I could not raise anyone from Brisbane, yet they assured me later they were all listening that day. The H44 beacon was heard in Tarawa several times but no sign of any H44s, even after I made an ISD phone call to alert them of the openings.

"The following stations are operational on HF in West Kiribati: Ritte T30BY, Willie T30AC, Henry T30BC (active on Abemama Island), as is T30AE, and Kobori T30AJX. I did meet Ritte and Kobori (an MF) while I was there. I think Ritte would make good use of a six metre transceiver if it were sent over to him.

"I left Tarawa on 14/12 for Tuvalu T20. Here I

stayed at the only hotel, the Valaiku Lagi. Again I was issued with a full call, T20AR, and during the week I was there I worked the following stations: 15/12 1040 to 1156 three VK2s and three VK4s. Most signals were from S1 to S5. There is only one active station in Tuvalu, Ian Anderson T20AA. I left my six metre equipment and antenna with him, so let us hope he puts it to good use. As a matter of interest, Funafuti, the capital, has only a grass airstrip and children play on the strip when no planes are around!

"I had to return to Brisbane via Suva, Fiji, so, with my licence arranged well in advance, I operated from the Coral Coast as 3D2AR for about four days. I worked eight VK2s, one VK3, three VK4s, seven ZLs and one FK.

"Whilst in Suva, I looked up Raj 3D2ER, and found him a little shaken from the recent events in Fiji.

"Before I left on this expedition I had a bad feeling that we were overdue for a poor Es season, and sure enough that is exactly what happened. Future Es type expeditions might be best left until the bottom of the coming Cycle 22."

Thanks Neville for your interesting letter. Both you and Kland in general were unfortunate to have the Es collapse so dramatically — no one from VK5 reported any sign of you during your stay in the Pacific.

SIX METRES

John VK4ZJB, sends a short letter with a copy of his QSL from Nev T20AR, for his contact with him on 15/12 at 1156 UTC. As John says, not the time. Almost midnight at Tuvalu! Perhaps we were all listening at the wrong time.

John also worked VK9NS, on 11/2 during the morning whilst he was mobile in Brisbane. Signals were 5 x 9 both ways. He said no sign of TEP yet but maybe soon.

He was also pleased to work VK5LP on two metres on 16/12 at 2331, something we had both been wanting to do for many years but never seemed to be around at the same time.

Tom VK4ZAL, also sent a copy of his QSL from T20AR which was on 16/12 at 0926 which is a new country for him as well.

Another letter came from Vince VK2VC, also for his contact with Neville T20AR on 15/12 at 1104. Vince also mentioned Don VK2BXM, was at the time of writing at Cape Hallett in Antarctica as VK0AT. It would make Don feel the effort was worthwhile if he was able to work someone on six metres whilst there.

Whilst still on six metres, Steve VK4KHQ/3D2S, says that since transferring within Mount Isa Mines, he has settled into his new daytime job and finds he can now use his six metre keyer most nights on 52.050 and 52.060 MHz from 0700 to 0830 UTC with some occasional operating at the weekends.

Steve said the Ross Hull Contest was a disappointment with only two contacts to VK5ZAH and VK3YZV, and heard the Darwin beacon once but could find no one to work. He said it was fortunate really, as conditions just before the contest were really good, with two way SSB contacts on 17/12 to VK4ZJB, VK4FKX, VK2VYG, VK5ZCF, VK5ACY, and VK5ZAH. Also had two way RTTY contact with Paul VK2VYG, in Broken Hill on the same date. Is this some mode/distance record, he asks? Does anyone know?

Steve ran his keyer for a total of 96 hours 44 minutes during the contest so he thinks he was unlikely to have missed many openings, they just were not there!

TWO METRES

Ray VK3LKL, at Heywood, mentions the following as being his Es contacts for December 1987. 10/12: 0541 VK4ZAZ 5x9; 0543 VK4BE 5x8; 0547 VK4JUL 5x7; 0555 VK4TN 5x9. On 11/12: 0920 VK5OH signals heard both ways but no full contact. 16/12: 2310 VK4AGO 5x9; 2345 VK4ZWH 5x8. On 18/12: 0233 VK6ZL 5x9 with Peter being audible for a full hour; 0212: 0044 VK4BRP 5x4. January 1988 — nil! The final comment says it all.

John VK4JUL, sends a short note to say that, on two metres, on 11/1 at 1000 UTC he worked Gordon VK2ZAB 5x7; 12/1 VK2ZAB 0945 5x5; VK2DOV 0800 5x1; 13/1 ZL2TPY 1745 5x8; and ZL2TPY again at 11/12 5x8. John would be happy with those fast two contacts.

On 14/1/88, John worked ZL1AVZ at 1930 5x3 on 432 MHz (Even better... 5LP). Bill VK4LC, worked Brian ZL1AVZ first at 5x6. They were the only two VK4s to work Brian. Both John and Bill were pleased to have Brian come to Queensland where Bill met him personally on 1/2 and John spoke to him by telephone on 4/2.

John VK4JUL, said he heard VK4ZSH having "a QSO of sorts" with ZL2TPY from some portable location on 432 MHz. Unable to confirm. Also, John said there had been no six metre contacts since 23/12.

Matthew VK3TAY, writes to report an unusual occurrence on two metres on 15/1. Whilst at his holiday home at Wy River, western Victoria (16 kilometres SW of Lorne), at 2300 a huge sea-fog rolled over the hill and blocked the view of the ocean about 200 metres away. Thinking this may enhance propagation, he turned on the IC-290H with a five element beam and heard VK7REC on 146.900 MHz, at S9+ which he said is not there. But when he put out a call, VK2DVZ in Tare (300 kilometres north of Sydney) came back with full quelling and maintained the contact for an hour, when VK2YHX at Newcastle broke in at 0000. Their signals were strong with very little fading. VK2XKE, in Sydney, also broke in but was not able to make proper contact. Matthew looked on reverse several times but could not hear anything until at 2323 he could just hear VK2DVZ, at S1, but not good enough for a contact. Later Russell VK7ZAC, could hear VK2YHX on reverse at S3 to S5. The propagation faded at 0100.

On 12/1, VK3TAY was able to work Ian VK7QF at Burnie, using their handbags with 10 watts, signals to S3 which is good for a rubber duckie antenna both ends!

FROM JAPAN

Hat JA1VOK, reports in his *World VHF News* column of the Japanese magazine *Five-Mine* that DX had been rather quiet in JA during December though ZL television was being heard from time to time. And, according to KH6AIA, there was Es between KH6 and W5/6 on 14/12. 5W1GP will be operational on six metres until August 1989. His manager is Satoji Someya JA6QCF, 22Han, Fujiwaraku, Sakai City, Oita 876, Japan. The name of 5W1GP is Yama and his home call sign is JA6HOR.

The column also reports LU3EX, in Argentina, had some good contacts last equinox when in October he worked YS1ECB, OA4AS, HK1BAU, HK1EOR, FM3AG, FM3BY, PY5, FY7THF, PY2AA and HC2FG. On 27/10 he worked NE8ZVNP, WZ6ZV/P2, KP2A and in November VY4APR. Whilst a number of these are in South America it still represents a good coverage as the distances involved can be considerable. Those in Peru, Ecuador, Colombia, Puerto Rico are getting to be some distance away and all north of the equator and at that time of the year some TEP may have been involved as well as double hop Es. If this can be taken as any indicator, stations in VK and ZL and the Pacific islands should watch the equinoxial periods closely for the next few years as these will be the best periods for TEP and F2 contacts on six metres.

NEW CALEDONIA

Phillip Hardstaff FK1TS, sent me two very interesting letters which arrived just too late for inclusion in last month's notes. He writes:

"It is now the day after Christmas and I have just sat through two of the worst days this month on six metres. On Christmas Day I worked NE 3D2AR, today I worked ZL1MQ and ZL3NE as the result of ZL television being in for 10 minutes. Nothing else."

"During November and early December I worked five countries — VK, ZL, FK, JA, and 3D2. Have worked lots of VK1, 2, 3, 4 and VK5RO, ZL1, 2, 3, 4, JA1, 2, 3, 4, 6, 7, and 9, heard but not worked VK6, VK8, VK9N, JA5, JA8, JA0, no VK7s although VK7RST has been heard. Also heard Japanese fishermen on 52.480 MHz FM (mistaken by ZLs and VKs for FKs talking in French?). The biggest "scob-story" of all was to hear Neville calling CQ as T20AR one morning but I had left the linear at my work place. I called him for five minutes with 2.5 watts. He heard me but could not get my call sign (he was 5x3). So, now the linear comes back every night. So far this year Hen FK1TKD I have seen on six metres, others seem to be using the T08 prefix for the South Pacific Games."

"I took the FT-690 into the club on 16/12 and, running on batteries and in-built whip stuck out the window, worked ZL1AKW, ZL2TPY, VK4VC, VK4PU and VK4HD as T08KPG (Club call sign) between 0800 and 0830. This made quite an impression on the HF boys!"

"Longest contacts this winter were either to VK2YVG in Broken Hill or VK5RO in Adelaide. 12/12 was probably the best day here, particularly as working ZL4TBN and ZL4LV made WAZL for me. Another highlight would have been working VK2XJ 5x9 using 10 watts of FM. It seems really difficult doing on FM."

"In my work hours workshop I run about 20 watts into a dipole centred on ZL and JA. At home I use the same equipment which puts about 12 watts into the X-beam with about 5 dB gain."

"Two main points of agitation: First, people who don't use standard phonetics. The JAs are the worst at this and I could probably have doubled my JA score if it wasn't for trying to work out what they were saying. Some ZLs and VKs are just as bad, but a little easier to understand. Secondly: Turks — who talk on and on and on in a contact on 52.050 MHz, the call channel. If I have need to have a contact on the call channel, I limit it to calls and signal reports only and I wish others would do the same. When conditions are bad it is not always possible out here to QSY and hope to maintain the contact, so you if you need to have a contact on the calling frequency please keep it brief. (Perhaps your comments will carry some extra weight, Phillip, but I have been trying to get this point across for years... 5LP.)"

"During 1988, I will be moving around quite a bit. February 15 to 19: at Tonga. Then May 30 to June 3, Vanuatu or Fiji; August 15 to 26 American Samoa; September 19 to 30 Fiji (3D2); October/November probably Rarotonga (ZK1). There will be stopovers in ZL as well. Whilst in all these places I will be checking out the six metre scene there and try to encourage some beacon building and get some contacts so we can publish names and phone numbers of people with six metres so as to make the Pacific a little more accessible. I will try to fly over to Niue while in Tonga also. I will confirm the above arrangements as plans unfold."

Phillip sent a copy of his log which shows he started working JAs on 8/11 and the following is an abridged version of his log to show what is being heard in New Caledonia. 8, 9, 10/11 JA1, 2, 3, 4, 6 and 7; 24/11 VK4; 27/11 ZL1, 2, 3; 28/11 ZL1, 2, 3; 29/11 VK2; 1/12 ZL1, 2 and 3; 2/12 ZL2 and 3; 4/12 FK1TK; 5/12 ZL1, 3, VK2 and 4; 7/12 VK2XJ; 9/12 VK2XJ; 10/12 ZL1, 2, 3, VK2 and 4; 11/12 VK2, 3, 4 and 5; 12/12 VK1, 2, 3 and 4, ZL2, 3, 4; 14/12 VK2BA, T08KPI, ZL1; 15/12 ZL1, 2, 3, FK1TK, VK2BHO; 16/12 VK2, 3, ZL1, 2 and 3; 17/12 VK2, 4, ZL1, 20/12 VK2, ZL1 and 2; 21/12 VK2XJ; 22, ZL1, VK4ALM, FK1TK; 23/12 VK1, 2, 4, ZL1 and 3;

24/12 VK4JUL, ZL1, VK4ALM, 3D2AR; 25/12 FK1TK; 26/12 ZL1; 28/12 ZL1, 2, VK2, FK8FL. Nothing whatever heard from 29/12 to 4/1/88, when VK2XJ was worked; nothing on 6/1 and 7/1 etc.

Summing up, Phillip worked 31 ZLs, 45 VKs, 42 JAs, 3D2AR and the FK8s. So it was just as well Phillip got into the band early or he would have found six metre contact in very short supply. It is good therefore, that Phillip is showing this kind of interest as it helps to keep the Pacific area alive and when that happens it can encourage others to come on-air.

It seems to me that over the years there have probably been many missed opportunities because no one was at the Pacific end. The expeditions by Neville VK4ZNC, also help to set the ball rolling. I am sure that, from now onwards, we shall be getting more TEP and F2 contacts and to work DX one needs to be particularly vigilant during the equinoxes for really long haul contacts, and during the summer particularly for extended Es contacts. By the way, the readers have these notes, we will see the March/April issue of the magazine. Experience seems to indicate the autumn period is slightly better than the spring period for Australia anyway. The simple answer to those who ask me how soon can we expect to work some new countries is from now onwards, but you will have to work at it. That means watching band conditions, calling on six metres and not just listening, and having any contacts with exotic stations short so that the multitude can have a share too.

Most times there is no need for any more than an exchange of call signs, signal report and probably your name — nothing else is required except the confirmation from the other end. That way more will be seen in what is available to a lot of the experienced two metre Es operators — they can work 10 stations in five or six minutes if necessary. It is a different matter if the band stays open for an hour or more, after everyone is satisfied you can go back and spend a little more time with the other end-stations if they are still there. If the DX station feels the need to work his contacts on 52.050 MHz, then respect this, and don't go calling CQ yourself whilst he is still there or you can hear others working him!

SOUTH EAST RADIO GROUP INC

The South East Radio Group (SERG) will be holding its annual convention again at Mount Gambier over the June holiday weekend. Being the Bicentenary year, they are aiming to make it one of the best they have staged so far.

As I have been invited again to judge the Home-Brew Section, may I urge readers who will be attending to really give extra support to this section as entries have been dwindling somewhat of recent years. For all the black boxes around there is still quite a lot of home building going on and some rather sophisticated equipment at that, and we would like to see it.

My policy in regard to kit-sets has always been that a commercially prepared PCB is acceptable providing the builder places the components on it and solders them. This then excludes commercially prepared modules. I also demand a very high degree of neatness and proper component orientation in kit-sets so that the finished product closely resembles commercial production — after all, you have for a leg-stamp with a good chassis or box and front panel.

Except in very specific cases, all construction, both inside and outside, should be available for scrutiny. Exceptions might be some types of cavity filters, amplifier cavities, and the like, or if you have a specific reason why the unit cannot be opened, please say why. The only case of no comment will be call sign, if any, together with an outline of the equipment should be with the article when it is on display.

THIS MONTH ON THE BANDS

Through January, six metres was not very spectacular, just the occasional quick openings to VK2. 9/2 was a reasonable day. Between midday and 9 pm local time, ZL1, 2, 3, and 4 were available, also



Eric's new location at Meningie. David VK5KK is up the tower!

VK2, 3 and 4. Col VK5RO reports that, during the evening of 9/2, Ian VK3ALZ, was extremely strong on two metres from some hill-top. Good signals also from VK3UM and VK3DUQ. In the other direction, VK6AOM, at Esperance.

On two metres, 1/2, VK6WG, in Albany, was worked, also VK6AOM, plus VK3 stations. Good conditions continued to prevail on 3/2 with more VK3s, (VK3AUG and VK3AUU during the morning and VK3ALZ, VK3UM and others in the evening).

Certainly the poor Es conditions over the Christmas and New Year period was received with dismay in many places. It seems that this time the good conditions came earlier, hence the good two metre Es openings.

The VK5LP establishment, after getting going on the bands, found TVI in the form of overload problems at a group of elderly citizens homes across the road. An inspection revealed a mast-head amplifier with about 20 dB gain feeding into a distribution amplifier with about 30 dB gain! The whole thing was such a poor installation that I decided if I was to have any peace I would have to upgrade the system. First move was to disconnect the masthead amplifier, as the signals are good enough not to need the two amplifiers. Cleaning and generally overhauling the CA16 antenna then produced four good channels. One section of the homes still had snow so out came the amplifier. This required the second RF amplifier to be replaced and the section which had been supplying the area of poor reception was found not to be

even connected to the amplifier. Obviously the installer, when he found poor signals in part of the building, just added a further amplifier. The simple addition of a 1000 pF capacitor connected the fifth outlet to the system so the whole building now has the best signals ever. A series tuned trap for six metres and one for two metres cleaned up every trace of signal getting into the system. When my antenna points to the south-east I look right down the throat of the elderly homes' antenna but at least now, if needed, I can use my amplifiers on 52, 144 and 432 MHz. A long time-consuming job but a good exercise in public relations!

ROSS HULL CONTEST

Doug VK3UM, has sent me an outline of some suggested changes to the Ross Hull Contest. They certainly are a change! I had hoped to include them in this month's notes but I have already run out of room. Hopefully I can include them next month. In the meantime, a copy to the Contest Manager for his consideration.

CLOSURE

That seems to be about all that is relevant this time. I hope now to be able to spend a little more time on the bands and keep up with what is going on. Closing with two thoughts for the month: "Did you hear about the despondent cockroach who committed insecticide?" and "Shakespeare once said that the evil that men do lives after them. On television, this is called a re-run". 73, the Voice by the Lake.

EXAMINATION DEVOLUTION UPDATE

Jim Linton VK3PC

4 Ansett Crescent, Forest Hill, Vic. 3131

The Department of Transport and Communication (DOTC) plans to approve examiners to conduct the three classes of amateur operator certificates of proficiency from June 1, 1988.

DOTC will continue to conduct examinations where required and prepare examination papers until March 1, 1989.

The Department held public forums throughout Australia in February to explain and answer questions about exam devolution. DOTC said the response to the forums had been very encouraging. It was now clear that a number of educational institutions and radio amateurs are likely to take a very active part in the examination process.

The devolution of exams allows individuals to prepare and conduct examinations that will qualify successful candidates for certificates of proficiency.

To prepare the examination papers, persons may develop their own questions, or obtain a copy of the Department's question bank. DOTC could possibly, in the future, consider publicly releasing the question banks — a practice already done by the United States Federal Communications Commission.

The Department admits that, while examiners can be expected and required to maintain strict security over their examination papers, the question banks would eventually leak out.

Under devolution, the examinations can be made up of questions unique to the examiner, a combination of the examiner's and the Department's

questions, or contain only DOTC questions from their question banks expected to contain 500 questions.

A copy of the Department's Morse code generating program can be obtained by examiners to prepare code examinations.

The current examination standard of Morse code must be used. For the AOCOP examination, individual Morse characters are sent at 12 words-per-minute with the spacing adjusted to achieve 10 words-per-minute — the novice examination uses characters sent at eight words-per-minute and the spacing adjusted to achieve five words-per-minute.

Applications for examination approval for any class of certificate will be considered from individuals, colleges, institutions, and other like educational bodies and amateur radio clubs. Applications must provide full details about those seeking approval, and a copy of the proposed examination.

A list of equipment available for the Morse code test, details of the qualifications of those preparing the examinations, and an affidavit to the effect that all requirements and conditions of DOTC will be met. Examiners must verify the identity of all candidates. Documents with the candidate's photograph or signature should be viewed. In instances of suspected candidate substitution, the examination will proceed to normal conclusion, and then a report submitted by the examiner for the Department to follow up.

Written results of examinations are to be

provided to candidates and individually signed by the nominated examiner. The candidates can then approach DOTC to seek the appropriate certificate and station licence.

This article is an update summary of examination devolution. Those interested further, or wishing to become examiners, should obtain the latest DOTC document "Amateur Operator Certificates of Proficiency — Examination Approval and Examination."

Inquiries should be directed in writing to: Manager Regulatory, Operation Branch, Broadcasting and Radio Communications Services Division, Department of Transport and Communications, PO Box 34, Belconnen, ACT. 2616.

Editorial Comment: Both Jim and the Federal Education Officer Brenda VK3KT attended the DOTC meeting. Brenda's account of it is on page 48. We have published both, because each reported on different aspects, with little overlap. —Ed.

RSGB 75TH ANNIVERSARY

The Radio Society of Great Britain (RSGB) will be issuing GB75 prefix call signs for special event stations during its 75th anniversary year.

Already the RSGB headquarters club stations, GB75RS and GB75HQ, have been active on 20 metres.

The RSGB has advised it will issue the prefix to other stations set up to promote the hobby of amateur radio during 1988.

RON WILKINSON ACHIEVEMENT AWARD

No nomination was received for this award in 1986. However, Executive has great pleasure in announcing that, for 1987, it is awarded to Eric Jamieson VK5LP. Eric was nominated by the VK5 Council primarily for his services to *Amateur Radio* magazine, to which he has contributed the monthly column *VHF UHF* — an expanding world and its predecessor *VHF Notes* since December 1969.

There is no other contributor to AR who has even approached this record for uninterrupted regularity. Others who have been, and are, responsible for monthly columns and the like, must wonder not only how has Eric kept it going for so long, but how has he been able to find so much about which to write!

It is also obvious that, until his recent move to Meningie produced a temporary interruption of activity, Eric's awareness of VHF and UHF doings was not just hearsay, but was based on many continuing personal "hours in the shack". Such persistent devotion is the mark of a very rare type of person indeed, and it is not surprising that Eric's capabilities have been recognised in other fields as well.

On page 43 of AR for September 1985, there is a detailed account of Eric's career in many different areas of public life, resulting in his recognition in 1984 as "Citizen of the Year", and in 1985 by his being awarded the Order of Australia. The WIA is honoured by his acceptance of the Ron Wilkinson Achievement Award. I am sure that even Ron himself, before his death in 1977, could not have suggested anyone who even then had done more to earn such a distinction.

Bill Rice AX3ABP



Eric Jamieson VK5LP, in the shack at Meningie.

—Grateful thanks to Valerie and her OM David VK5KK, Eric's wife Myrna and Jenny VK5ANW for supplying photographs of Eric



Try This!

CLEARING BRANCHES & LEAVES

Herb Unger VK2UJ

El Rancho, Alectown, via Parkes, NSW. 2870

There are many problems associated with the use of trees as supports for antennas.

In some cases it is difficult to support the wire clear of the leaves and branches, especially if the tree is lacking in height.

This idea has proved very successful at this QTH. It consists of a length of one inch steel water pipe.

A length of quarter inch round iron, or similar material, three or four feet long, is bent into an inverted Y shape and inserted into the bottom end of the pipe. The idea is to climb up the tree as far as possible, carrying the pipe vertically and hooking the inverted Y on to a suitable limb adjacent to the trunk. Wind several turns of fencing wire around the pipe and main vertical

trunk of the tree as high up as can be reached. This should bring the top well above the leaves of even a comparatively small tree.

Before ascending the tree, an old cup-type of telephone insulator is fitted on the top of the pipe, together with a small pulley, through which the antenna or strain wire is inserted, depending on whether it is an intermediate or end pole.

If it is to be a long wire antenna, it is wise to hang a weight on the end of the strain wire to compensate for the tree swaying in the breeze.

Pine Tree showing Extension Pipe Antenna Support.



How's DX?

Following is the latest information regarding the DXAC study on the future of the ARRL DXCC, also the DXCC Rules forwarded to me by John Parrott WAFRL, Chairman of DXAC.

In his covering letter, John also advises that SO and Aruba P40 are now new countries for DXCC.

Ken McLachlan VK3AH

DXAC SPECIAL STUDY OF THE DXCC

REFERENCES:

1. Minute 59 of the July 1986 meeting of the ARRL Board of Directors
2. Minute 70 of the March 1984 and Minute 103 of the October 1984 Board of Directors meetings
3. Minute 87 of the July 1987 meeting of the ARRL Board of Directors

The DXAC has completed its Special Study of the DXCC in accordance with Reference 1.

The cliché "if it ain't broke, don't fix it" became the battle cry of the DX community world-wide when it became known that the DXAC was studying the possibility of restructuring the DXCC program. The message we received was loud and clear; add a few more awards, clarify and simplify some of the rules, but don't change the basic program — just fine tune it.

To simplify the process, the DXAC recommendations are contained in a new set of DXCC rules. (See following rules). Among other things, the DXAC is recommending a revision to the present DXCC Rules format, a new country criteria and a deletion criteria under the provision of Reference 2, an expanded accreditation criteria and general "wordsmithing" to pull it all together into a simple and easily understood set of rules.

Preliminary to writing these new rules, the DXAC studied the data obtained from approximately 1500 opinion polls, individual letters, alternate DX programs, including the Law of the Sea per Reference 3, comments from members of other National Radio Societies and committee participation in Hamfest, Hamventions and other meetings of DXers. Many worthy recommendations were considered and discarded because they were not practical to implement or manage. Other majority recommendations, such as dropping or shelving DXCC Countries that have been inactive for long periods of time, were considered as not being in the best interest of the DXCC program. A majority of DXers also feel that some countries should be deleted from the Countries List. The committee could not find a simple solution to this issue without decimating the Countries List; therefore, we do not recommend any deletions at this time. However, by and large, the DXAC acceded to the wishes of the DX community in what the DXCC program and Countries List should include and how it should be conducted.

The recommended DXCC Rules have been co-ordinated with the ARRL Headquarters staff and represent a composite of the DXAC and staff efforts with the DXAC position prevailing in the following version. The DXAC surveys reflect that the DXers want single band DXCCs and a 5BDXCC endorser by additional bands as they become available and unrestricted, such as the new WARC bands.

The DXAC recommends single band additions to the rules along with a proposed start date. The Headquarters staff does not agree, arguing that the 80 and 40 metre single band DXCC serves only the "Old Timers" and provides little or no incentive for the new amateurs. Our survey shows just the opposite. The Honour Roll members do not want the single band DXCC, but the younger amateurs do.

The DXAC recommends that the start date of all new single band DXCCs be November 15, 1945, so that those who have worked a lifetime to attain

their present position will not be penalised. This is also consistent with the negative position most DXers take with regard to a fresh start of anything related to DXing. The lingering bitterness over the start date of the DXCC-CW award is a good example. The Headquarters staff does not agree with the DXAC on this issue.

The Headquarters staff believes that the DXAC Accreditation Criteria is too detailed in a couple of instances. The DXAC position is that the accreditation part of the DXCC Rules has caused more bad press for the League than all the rest of the rules combined. We believe that the better informed a DXer is, the less likely his/her DX operation will be disallowed, and the less likely that there will be bad press for the ARRL. The DXAC stands by its recommended version.

The DXAC recognises that implementing all of the DXAC recommendations may increase the DXCC manager's workload, and additional help may be required unless a workload offset can be arranged. One area which should be explored with the view of reducing costs of DXCC management is the present processing mechanism for the new DXCC member. There is an extravagant waste of time and effort at the DXCC Desk, counting the initial 100 QSL cards for the basic DXCC award. This task could be performed by volunteers, as is the case with some other ARRL awards. There is a perception that the integrity of the DXCC would be in jeopardy if the basic DXCC card count was conducted by anyone other than the DXCC Desk representative. In my judgment, this attitude is ludicrous and without merit.

On behalf of the DXAC, I thank the Board of Directors for giving us the opportunity to play a small role in the future of the DXCC. If approved, we are confident that the validity of our recommendation will be proven repeatedly in the years to come and will serve to enhance and maintain interest in DXing by the young and "Old Timers" alike. I thank the DXAC members who have given unselfishly of their time and experience, and to the Headquarters staff who have been most cooperative in all aspects of this study. I extend a special thanks to my sub-committee chairmen, Robert Beatty W4VQ, James Rafferty N6RS, and James Spencer W6SR, who sifted the wheat from the chaff to give us a road map for the future of the DXCC.

The DXAC recommends that the Membership Communications Service Manager be requested to explore the merits of utilising designated Volunteer Verification Specialist (QSL card counters) for applicants of the basic DXCC Award. In time, and for monetary reasons, we may have to employ a different verification mechanism for the DXCC awards. If volunteers are incorporated into the system at this time, it may well offset additional costs which could accrue as a result of adapting the DXAC recommendations, and at the same time provide experience for further decentralisation of the DXCC Awards program at some future date.

The DXAC recommends that the Board of Directors approve the attached DXCC Rules, which were unanimously adopted by the DXAC, and make them effective from July 1, 1988.

AMERICAN RADIO RELAY LEAGUE DX CENTURY CLUB RULES

INTRODUCTION

"... the number of countries worked is increasing becoming the criterion of excellence among outstanding DX stations."

Clinton B DeSoto W1CIBD, October 1935 QST

From its simple beginnings, culminating in the announcement of the new DX award, the DX Century Club, in September 1937 QST (which was itself based on the "ARRL List of Countries"

published in January 1937 QST), membership in the ARRL DX Century Club (DXCC) has been the mark of distinction among radio amateurs the world over. That it is regarded with such prestige by DXers is a testament to its integrity and level of achievement. The high standards of DXCC are intensely defended and supported by its membership. The rules established by the founders of DXCC were consistent with the art of amateur radio as it existed at the time. As technology improved, the ability to communicate, the rules were progressively changed to maintain a competitive environment and complement the gaining popularity of DXCC.

Because of vast changes in the international scene brought about by World War II, it logically followed that DXCC needed to be recast, as indicated in December 1945 QST. Ultimately, after a great deal of study, the first post-war DXCC Countries List emerged, published in February 1947 QST. The new DXCC Rules appeared in March 1947 QST. Contacts were valid from November 15, 1945, the date US amateurs were authorised by the FCC to return to the air.

The DXCC rules today represent the aggregate of experience gained from administering post-war DXCC. Some countries on the DXCC Countries List do not of course, meet the present criteria. This includes countries "grandfathered" from the WWII era, or those that met the criteria as it existed at the time and are not subject to deletion (see Section III for the appropriate grounds for deletion). Changes are announced under DXCC Notes in QST.

SECTION I — BASIC RULES

1. The DX Century Club Award, with certificate and lapel pin (there is a nominal fee of \$2 for the DXCC lapel pin) is available to amateur radio operators throughout the world free of charge. ARRL membership is required of DXCC applicants in the US and possessions, and Puerto Rico, and CRRL membership is required for applicants in Canada. ARRL membership is not required of foreign applicants. All DXCCs are endorser (see Rule 5). There are 12 separate DXCC awards available, plus the DXCC Honour Roll:

- a) MIXED (general type): Contacts may be made using any mode since November 15, 1945.
- b) PHONE: Contacts must be made using radio-telephone since November 15, 1945. Confirmations for cross-mode contacts for this award must be dated September 30, 1981, or earlier.
- c) CW: Contacts must be made using CW since January 1, 1975. Confirmations for cross-mode contacts for this award must be dated September 30, 1981, or earlier.
- d) RTTY: Contacts must be made using radio-teletype since November 15, 1945. Confirmations for cross-mode contacts for this award must be dated September 30, 1981, or earlier.
- e) 160 METRE: Contacts must be made on 160 metres since November 15, 1945.
- f) 80 METRE: Contacts must be made on 80 metres since November 15, 1945.
- g) 40 METRE: Contacts must be made on 40 metres since November 15, 1945.
- h) 10 METRE: Contacts must be made on 10 metres since November 15, 1945.
- i) 6 METRE: Contacts must be made on 6 metres since November 15, 1945.
- j) 2 METRE: Contacts must be made on 2 metres since November 15, 1945.
- k) SATELLITE: Contacts must be made using satellites since March 1, 1965.
- l) FIVE-BAND DXCC (5BDXCC): The 5BDXCC certificate is available to those amateurs who submit written proof of having made two-way communications with 100 or more DXCC countries

on each of five bands since January 1, 1969. This DXCC award is endorsable for additional bands (10/18/24 MHz not accepted at this time). SBXCC qualifiers are also eligible for an individually engraved plaque (at a charge of \$25).

■ **HONOUR ROLL:** Attaining the DXCC Honour Roll represents the pinnacle of DX achievement:

● **MIXED** — to qualify you must have a total confirmed country count that places you among the numerical top 10 DXCC countries total on the current DXCC Countries List (example: if there are 318 current DXCC countries, you must have at least 309 countries confirmed).

● **PHONE** — same as Mixed.

■ **CW** — to qualify, you must have a total confirmed country count for CW stations with the highest confirmed CW country count or among those between one and nine less than that total.

To establish the number of DXCC country credits needed to qualify for the Honour Roll, the minimum possible number of current countries available for credit is published monthly in QST. First-time Honour Roll members are recognised monthly in QST. Complete Honour Roll standings are published annually in QST, usually in the June issue. See DXCC Notes in QST for specific information on qualifying for this Honour Roll standings list. Once recognised on this list or in a subsequent monthly update of new members, you retain your Honour Roll standing until the next standings list is published. In addition, Honor roll members are recognised in bold print in the DXCC Annual List (usually published in the December issue of QST) for those who have been listed in the previous Honour Roll listing or have gained Honour Roll status in a subsequent monthly listing.

■ **1 HONOUR ROLL:** To qualify for a Mixed or Phone Number One plaque, you must have worked every country on the current DXCC Countries List. On CW, you must have the highest number of country credits given to any station. Write to the DXCC Desk for details.

2. Written proof (confirmations, ie QSL cards), of having made two-way communication must be submitted directly to ARRL Headquarters for all DXCC countries claimed. The use of the official DXCC application forms is required. Complete application materials are available from ARRL Headquarters. Confirmations for a total of 100 or more countries must be included with your first application. By ARRL Board of Directors action, 10 MHz confirmations are not creditable for DXCC.

3. The ARRL DXCC Countries List criteria will be used in determining what constitutes a DXCC country.

4. Confirmation data for two-way communications (ie contacts), must include the call signs of both stations, the country, mode, and date, time and frequency.

5. Endorsement stickers for affixing to certificates or pins will be awarded as additional DXCC credits are granted. For the Mixed, Phone, CW, RTTY and 10-metre DXCC, these stickers are in exact multiples of 25, ie 125, 150, etc, between 100 and 250 DXCC countries; in multiples of 10 between 250 and 300, and in multiples of five above 300 DXCC countries. For 160-metre, 80-metre, 40-metre, six-metre, two-metre and satellite DXCC, the stickers are in exact multiples of 10 starting at 100 and multiples of five above 200. Confirmations for DXCC countries may only be submitted for credits in increments that will at least bring the new total up to the next endorsement level.

EXCEPTION: Once per year, any participant in Mixed, Phone, CW, RTTY or 10-metre DXCC having an accredited DXCC total of 250 or more, or any participant in 160-metre, 80-metre, 40-metre, six-metre, two-metre or Satellite DXCC with an accredited DXCC total of 150 or more, may make a submission without regard to the number of cards submitted.

6. All contacts must be made with amateur stations working in the authorised amateur bands or with other stations licensed or authorised to work amateurs. Contacts made through "repeater" devices or any other power relay method (aside from

Satellite DXCC) are invalid for DXCC credit.

7. In countries where amateurs are licensed in the normal manner, credit may be claimed only for stations using regular government-assigned call signs or portable call signs where reciprocal agreements exist or the host government has so authorised portable operation. No credit may be claimed for contacts with stations in any country that has temporarily or permanently closed down amateur radio operations by special government edict where amateur licenses were formerly issued in the normal manner.

8. All stations contacted must be "land stations". Contacts with ships and boats, anchored or under way, and airborne aircraft, cannot be counted.

9. All stations must be contacted from the same DXCC country.

10. Contacts may be made over any period of years since November 15, 1945, for the mixed, phone, RTTY, 160-metre, 80-metre, 40-metre, 10-metre, six-metre, and two-metre DXCCs, January 1, 1975, for the CW DXCC, and from March 1, 1965 for the Satellite DXCC, provided only that all contacts be made under the provision of rule 9, and by the same station licensee. Contacts may have been under different call letters in the same area (or country), if the licenses for all was the same. (You may feed one DXCC from several call signs held simultaneously as long as the provision of rule 9 is met.)

11. Any altered, forged or otherwise invalid confirmations submitted by an applicant for DXCC credit may result in disqualification of the applicant. Any holder of a DXCC award submitting altered, forged or otherwise invalid confirmations may forfeit the right to continued DXCC membership. The ARRL Awards Committee shall rule in these matters and may also determine the eligibility of any DXCC applicant who was ever barred from DXCC to reapply and the conditions of such application.

12. Operating Ethics:

a) Fair play and good sportsmanship in operating are required of all DXCC members. In the event of specific objections relative to continued poor operating ethics, an individual may be disqualified from DXCC by action of the ARRL Awards Committee.

b) Credit for contacts with individuals who have displayed continued poor operating ethics may be disallowed by action of the ARRL Awards Committee.

c) For a) and b) above, "operating" includes confirmation procedures and/or documentation submitted for DXCC accreditation.

13. Each DXCC applicant must stipulate that he/she has observed all DXCC rules as well as all pertinent governmental regulations established for amateur radio in the country or countries concerned and agrees to be bound by the decisions of the ARRL Awards Committee. Decisions of the ARRL Awards Committee regarding interpretations of the rules here printed or later amended shall be final.

14. All DXCC applications (both new and endorsements) must include sufficient funds to cover the cost of returning all confirmations (QSL cards) via the method chosen. Funds must be in US dollars, utilising US currency check or money order made payable to the ARRL, or International Reply Coupons (IRCs). A chart showing the various return postage rates is available from the DXCC Desk. Address all correspondence and inquiries relating to the various DXCC awards and all applications to: ARRL Headquarters, DXCC Desk, 225 Main Street, Newington, CT 06111, USA.

15. The ARRL DX Advisory Committee (DXAC) requests your comments and suggestions for improving DXCC. Address correspondence, including petitions for new country consideration to: ARRL Headquarters, DXAC Desk, 225 Main Street, Newington, CT 06111, USA.

SECTION II — COUNTRIES LIST CRITERIA

The ARRL DXCC Countries List is the result of progressive changes in DXing since 1945. The full

list will not necessarily conform completely with the current criteria since some of the listings were recognised from pre-WWII or were accredited from earlier versions of the criteria. While the general policy has remained the same, specific mileages and additional points have been added to the criteria over the years. The specific mileages in Point 2(a) and Point 3, mentioned in the following criteria, have been used in considerations made in April 1960 and after. The specific mileage in Point 2(b) has been used in considerations made in April 1963 and after.

When an area in question meets at least one of the following three points, it is eligible as a separate country listing for the DXCC Countries List. These criteria address considerations by virtue of Government (Point 1) or geographical separation (Points 2 and 3), while Point 4 addresses ineligible areas. All distance are given in statute miles.

POINT 1, GOVERNMENT

An independent country or nation-state having **sovereignty** (that is, a body politic or society united together, occupying a definite territory and having a definite population, politically organised and controlled under one exclusive regime, and engaging in foreign relations — including the capacity to carry out obligations of international law and applicable international agreements) constitutes a separate DXCC country by reason of Government. This may be indicated by membership in the United Nations (UN). However, some nations that possess the attributes of sovereignty are **not members** of the UN, although these nations may have been recognised by a number of UN-member nations. Recognition is the formal act of one nation committing itself to treat an entity as a sovereign state. There are some entities that have been admitted to the UN that lack the requisite attributes of sovereignty and, as a result, are **not recognised** by a number of UN-member nations.

Other entities which are not totally independent may also be considered for separate DXCC country status by reason of Government. Included are Territories, Protectorates, Dependencies, Associated States, and so on. Such an entity may delegate to another country or international organisation a measure of its authority (such as the conduct of its foreign relations in whole or in part, or other functions such as customs, communications or diplomatic protection) **without surrendering** its sovereign status. DXCC country status for such an entity is individually considered, based on all the available facts in the particular case. In making a reasonable determination as to whether a sufficient degree of sovereignty exists for DXCC purposes, the following characteristics (list not necessarily all-inclusive) are taken into consideration:

a) Membership in specialised agencies of the UN, such as the International Telecommunication Union (ITU).

b) Authorised use of ITU-assigned call sign prefixes.

c) Diplomatic relations (entering into international agreements and/or supporting embassies and consulates), and maintaining a standing army.

d) Regulation of foreign trade and commerce, customs, immigration and licensing (including landing and operating permits), and the issuance of currency and stamps.

An entity that qualifies under Point 1, but consists of two or more separated land areas, will be considered a single DXCC country (since none of these areas alone retains an independent capacity to carry out the obligations of sovereignty) **unless** the areas can qualify under Points 2 or 3.

POINT 2, SEPARATION BY WATER

An island or a group of islands which is part of a DXCC country established by reason of Government, Point 1, is considered as a separate DXCC country under the following conditions:

a) The island or islands are situated off shore, geographically separated by a minimum of 225 miles of open water from a continent, another

island or group of islands that make up any part of the "parent" DXCC country.

b) This point applies to the "second" island or island grouping geographically separated from the "first" DXCC country created under Point 2(a). For the second island or island grouping to qualify, at least 1 500 mile separation of open water from the first is required, as well as meeting the 225 mile requirement of a) from the "parent". For any subsequent islands to qualify, the 500 mile separation would again have to be met. This precludes, for example, using the 225 mile measurement for each of several islands from the parent country to make several DXCC countries.

POINT 3. SEPARATION BY ANOTHER DXCC COUNTRY

a) Contiguous land mass: Where a country, such as that covered by Point 1, is totally separated by an intervening DXCC country into two areas which are at least 75 miles apart, two DXCC countries result. This straight line measurement is made at the closest point, and may include lakes and seas (that are part of the country) in the measurement. International waters may be included in the separation but do not contribute to the 75 mile minimum requirement.

b) Islands: Where two islands, of the government under Point 1, are totally separated by an intervening DXCC country (also under Point 1), each island counts as a separate DXCC country. No minimum distance is required. The test for total separation means that a straight line cannot be drawn from any point on one island to any point on the other island without passing through another DXCC country. This intervening country may be part of either island, another island, or part of a continent.

POINT 4. INELIGIBLE AREAS

a) Any area which is unclaimed or unowned by any recognised government does not count as a separate DXCC country.

b) Any area which is classified as a Demilitarised Zone, Neutral Zone or Buffer Zone does not count as a separate DXCC country.

c) The following do not count as a separate DXCC country from the host country: Embassies, consulates and extra-territorial legal entities of any nature, including, but not limited to, monuments, offices of the United Nations agencies or related organisations, other inter-governmental organisations or diplomatic mission.

SECTION III — DELETION CRITERIA

A DXCC country is subject to deletion from the ARRL DXCC Countries List if political change causes it to cease to meet Point 1 of the Countries List Criteria (a derivative of such change may cause it to meet Point 2 or 3) or if it falls into Point 4 of the criteria. Additions to and deletions from the DXCC Countries List come about as a result of a myriad of such political changes. Reviewing the nature of the changes which have occurred since 1945 as they affect DXCC, these changes can be grouped into categories as follows:

a) ANNEXATION: When an area that has been recognised as a separate country under Point 1 is annexed or absorbed by an adjacent Point 1 country, the annexed area becomes a deleted country. Examples: India annexed Sikkim (AC3); China annexed Tibet (AC4); Indonesia annexed Portuguese Timor (CR8).

b) UNIFICATION: When two or more entities that have been separate DXCC countries under Point 1 unite or combine into a single entity under a common administration, one new DXCC country is created and two or more DXCC countries become deleted. Example: Italian Somaliland (IS) plus British Somaliland (VQ6) became Somalia (60/VS).

c) PARTITION: When one country is divided or partitioned into two or more countries, one DXCC country is deleted and two or more DXCC countries are created. Example: French Equatorial Africa (FQ) was deleted and replaced by Central Africa (TL) Congo (TN), Gabon (TR) and Chad (TT). The partition category is not employed when the original political entity continues in some form. That is, if part of country A splits off to form country

B, the original DXCC country (A) is retained and one new DXCC country (B) is added. Example: the British Sovereign Bases on Cyprus (ZC4).

d) INDEPENDENCE: Mere independence does not result in a Countries List deletion. Examples: the Tonga Islands, then a British protectorate (VRS), is the dame country as the present listing of the Kingdom of Tonga (A3). Further, an entity already recognised as a separate DXCC country is not deleted because of a change in its independent status. Bangladesh (S2) is the same listing as East Pakistan (AP), which was already separate from West Pakistan by virtue of Point 3. Also, a country that merely changes its name (such as when Upper Volta became Burkina Faso) does not change its basic status as a DXCC country on the DXCC Countries List.

SECTION IV — ACCREDITATION CRITERIA

1. The many vagaries of how each nation manages its telecommunications matters does not lead itself to a hard set of rules that can be applied across the board in accrediting all amateur radio DX operations. However, during the course of more than 40 years of DXCC administration, basic standards have evolved in determining whether a DX operation meets the test of legitimate operation. The intent is to assure that the DXCC credit is given only for contacts with operations that are conducted appropriately in two respects:

i) proper licensing; and ii) physical presence in the country to be credited.

2. The following points should be of particular interest to those seeking accreditation for a DX operation:

a) The vast majority of operations are accredited routinely without any requirement for submitting authenticating documentation.

b) In countries where amateur radio operation has not been permitted or has been suspended or where some reluctance to license amateur stations has been evidenced, authenticating documents may be required prior to accrediting an operation.

c) Some DXCC countries, even though part of a country with no amateur radio restrictions, nevertheless require the permission of a governmental agency or private party prior to conducting amateur radio operations on territory within their jurisdiction. Examples: Deschutes Island KP5; Palmyra Island KH45; Kingman Reef KH5K.

3. In those cases where supporting documentation will be required, the following should be used as a guide as to what information may be necessary for the ARRL Awards Committee to make a realistic judgment of the legality of an operation:

a) Photocopy of license or operating authorisation. If license is a non-amateur format, it should authorise operation on amateur radio frequencies (not necessary all) and not be restrictive to geographical points of communications. Example: Use of amateur radio frequency only authorised between country "A" and country "B".

b) Contract agreements with governments.

c) Photocopy of passport entry and exit stamps.

d) For islands, a landing permit and/or signed statement of the transporting ship's, boat's or aircraft's captain showing all pertinent data such as date, place of landing, etc.

e) For some locations where special permission is known to be required to gain access, evidence of this permission having been given is required.

4. These accreditation requirements are intended to preserve the DXCC program's integrity and to ensure that the program does not encourage amateurs to "bend the rules" in their enthusiasm, thus jeopardising the future development of amateur radio. Every effort will be made to apply these criteria in a uniform manner in conformity with these objectives.

INTERESTING QSOs

DECEMBER 1987

CU2DG on 21 MHz SSB. Orlando on Azores

Island.

DF0MM/80 on 14 MHz SSB. Ben, near Frankfurt.

A special event station for the 60 years German

amateur radio anniversary.

JANUARY 1988

BV2B on 14 MHz SSB. QSL to PO Box 30547,

Taipei, Republic of China.

LS8E on 14 MHz SSB. QSL near Buenos Aires operating in the "Hunting Lions Contest". QSL to PO Box 20, Solano City 1881, Buenos Aires, Argentina.

YS1JBL on 14 MHz CW. Joe in San Salvador. QSL to Jose Bou Lopez, PO Box 1476, San Salvador, El Salvador.

DA1FR on 21 MHz CW. QSL via G4KIE.

—Contributed by Steve Pail VK2PS



Try This!

SCREW INSERTION

Herb Unger VK2UJ

El Rancho, Alectown, via Parkes, NSW. 2870

Have you ever tried, with great difficulty, to get a nut started in a confined space where only a finger can reach? I think we all have!

Here is a simple hint to overcome the problem. Use a small piece of grafting wax on the tip of your finger to hold the nut in place.

Grafting wax can also be used between the slot in the head of a screw and the screwdriver.

Grafting wax can easily be made by melting together equal quantities of resin, beeswax and fat.



QSP

NEW BROADCAST STATION

Hobart is to get a new commercial radio station by late 1989. Communications Minister, Senator Gareth Evans, said Tasmania's capital city was capable of supporting an independent FM station because it had some 200 000 potential listeners.

He said the Ipswich area of Queensland was also likely to join its own commercial FM radio station next year.

RADIO TIME SIGNALS

The following is an extract from the Chief of Naval Staff Newsletter (unrestricted) of December 1987.

Over the past years, major ships have relied on radio time signals transmitted from station VNG in Victoria. The RAN has since designed and built a unit to transmit the time service from Canberra. It is transmitted on the upper sideband of two assigned Naval frequencies, 12.082 and 6.488 MHz. The time is indicated by 1 kHz pulses at one second intervals by the leading edge of each pulse, four clipped pulses precede a wide minute pulse with a series of two wide pulses to indicate the half-hour and three wide pulses the hour. The service is controlled by a highly accurate frequency standard and is maintained in step with Universal Time.

—Contributed by Gerry Preston VK5FPI



SYDNEY — MELBOURNE — BRISBANE

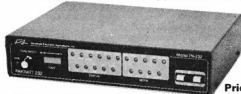


JOIN THE PACKET REVOLUTION!

New PK-232 Breakthrough

A new software enhancement makes the AEA PK-232 the only amateur data controller to offer six transmit/receive modes in a single unit.

★ Morse Code ★ Baudot (RTTY) ★ ASCII ★ AMTOR ★ Packet ★ Weather FAX



WITH FAX
Price \$699

An incredible 2000 percent per year growth in the number of PACKET RADIO OPERATORS has been recorded in the USA. This packet revolution is fast coming to Australia and EMTRONICS is ready to serve you! NEW PACKETKIT PK-232 — Morse, Baudot, ASCII, AMTOR, and packet data controller in stock now! This six mode machine goes with any RS232 computer or terminal. Call for full specs.



PK-87™
PACKET
CONTROLLER
\$399

The PK-87 is not just another copy, it's much more. With all the packet program features of the Multi-mode PK-232, the PK-87 is an economical new TNC designed to bring you enhanced, completely compatible packet software plus new hardware features for improved packet operation.

Software Enhancements

- AEA's exclusive MBX Mailbox Monitor command lets you read and save received data without confusing headers, call signs, or repeats. • New commands let you restrict the use of your station for connects and egoless functions. • Host mode for improved terminal program operation and development of specialized programs and applications. • Compatible with existing W0RL/1/VA/MBL/PBBS/Mailbox/Gateway programs, with complete software contained for remote selection of link type, modem type, etc. • Audited studies for terminal data rates from 300 to 9600 baud (programmable down to 45 baud), and software control to set on-air data rates from 45 to 9600 baud. While the PK-87 can be used for HF operation, AEA recommends the PM-1 packet modem as a high performance front end for best results in HF packet service. Only the new AEA PK-87 has all these features. Contact your local AEA dealer and get the packet revolution today by ordering the new PK-87.

Hardware Enhancements

- Light front panel status indicators show Connect, Transmit, and Command modes. Multiple Connects, Data Carrier Detect, Push to Talk, Status, and Connect. • High sensitivity (5 millivolts RMS) and dynamic range from 5 to 775 millivolts RMS. • Rear panel AT-5A output level adjustment from 5 to 100 millivolts RMS. • One mode hardware switching line provides system security in unattended VHF/UHF/PBBS/Mailbox and digipeater operation. • Modern designed circuitry guarantees compatibility with future high speed modem applications and developments. • 2000 8530 SCC provides dependable hardware HDLC for higher speeds, and AMO 7910 for reliable medium performance without calibration.

NEW 1KW EMTRON TUNER EAT-1000A Only \$549



This new EAT-1000A is EMTRON'S latest antenna tuner built with special request by many amateurs. Built with finest components available. 5 position antenna switch, cross needle SWR/power meter, built in 3.1 balun for open feedline and antenna terminals for close line, open feedline as well as longwire. EAT-1000A will tune almost everything from 1.8 to 30 MHz. At lowest price professional design and quality that EMTRON provides. MADE IN AUSTRALIA

NEW 300W EMTRON TUNER EAT-300A Only \$349



The finest 300 watt antenna tuner on the market with quality that only EMTRON can provide! Unique features such as: • Cross needle SWR/Power & reverse power meter • Built in 100 watt dummy load • Antenna switch including bypass • Built in 1.4 balun for open feedline • Lowest price & professional design • Matches everything from 1.8-30 MHz • Made in Australia by Emtron

OVER 1000 FAMOUS EAT-300 SOLD



EMTRON'S 5 fastest selling 300 watt antenna tuner with SWR meter, built in 1.4 balun, heavy duty ceramic switch and top grade components. Works with all rigs and is found in Amateur, Commercial and Marine services.

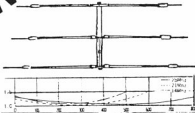
Only \$239

TET-EMTRON ANTENNAS

3el 10/15/20m band—HB33DX

Made in
Australia

NEW



Band	14/21/28 MHz
Element	3
Gain	8.5/8.5/10 dB
F/B Ratio	20 dB
VSWR	1.5
Power R	2 kW PEP
Impedance	50 ohm
Boom L	8.26m
Boom I	4.0m
Turning Radius	4.59m
Wind Surface Area	0.52m ²
Wind Load (EIA STD 80 MPH)	51.2 kg

Dr MAC TANIUCHI of TET Japan has now joined EMTRON IND. and improved his already famous phase-feed matching system based on the "HB3CV" concept. This new matching system provides an increase in gain roughly comparable to adding another element to the antenna while significantly improving the front to back ratio. The performance exceeds even conventional YAGI-UDA design and these new TET-EMTRON multiband beams exhibit extremely flat VSWR over a wide frequency range.

Our new antenna factory "TET-EMTRON" a division of EMONA ELECTRONICS is now producing a range of antennas aiming specially at the export markets of Japan, USA and Europe.

CORRESPONDENCE:
BOX K21
HAYMARKET, NSW.
2000



EMTRONICS

MAIL ORDERS
WELCOME

NSW & HEAD OFFICE:

92-94 Wentworth Ave, Sydney
NSW, 2000. TLX:AA72390
P.O. Box K21 Haymarket, NSW, 2000
Ph: (02) 211 0988
FAX: (02) 281 1508

VICTORIA:

288-294 Queen St, Melbourne
Vic. 3000.
Entrance from Lt. Lonisale St
Ph: (03) 67 8551 or 670 0330
FAX: (03) 670 0671

QUEENSLAND:

416 Logan Road, Stones Corner
Qld. 4120.
Ph: (07) 394 2555
FAX: (07) 394 4316



Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014



THE SOUTHERN PENINSULA AMATEUR RADIO CLUB INC.

(S.P.A.R.C.)
P.O. Box 206, Rosebud, Vic. 3939
Australia



FIRST SETTLERS AWARD

1803-1988



Sorrento today. A popular tourist resort in the Flinders Shire.

Envisioned by the
the Southern Peninsula where
Sorrento now stands was
settled in 1803 by Lt. Col.
David Collins

This First Settlement in
Victoria at Sorrento Bay lasted
from October 1803 to May
1804 when the settlement
was moved to Hobart, due
mainly to food and
challenges.

Certificate No.

In confirmation of 2-way radio. Contact with VK3BSP

Awarded To

Date

Mode

Band

President

Secretary



FIRST SETTLERS AWARD

The First Settlers Award has been produced by the Southern Peninsula Amateur Radio Club as a Bicentenary project for the whole of 1988.

The award may be obtained by one two-way contact with club station, VK3BSP. Such contact is to be confirmed by QSL card and with a \$2 fee to cover production and postage costs. School radio clubs will receive one free award.

Applications should be addressed to:

SPARC, PO Box 206, Rosebud, Vic. 3939.

The Club Station will operate as often as

possible during the currency of the award on various open bands but can always be found on club nets on Tuesday evenings at 0930 UTC and Sunday mornings at 2330 UTC, on 3.620 MHz. The club will listen for school clubs on two metres, particularly during lunchtimes.

Shortwave listeners will be eligible to receive the award on receipt of hearing one reported contact with VK3BSP plus the appropriate fee as stated.

The issuance of the award is an approved Bicentenary project.

—Contributed by J A Donald, Publicity Officer, SPARC

Intruder Watch

Bill Martin VK2COP
FEDERAL INTRUDER WATCH COORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

Well, I have just discovered that the Post Office has a sense of humour... they have increased the price of IRCs from 85 cents to \$1.35 — they must be joking!

In December 1987, the following people helped out with intruder reports:

VK2DEJ, VK2EYI, VK3AMD, VK3XB, VK4AKX, VK4BG, VK4BHJ, VK4BTW, VK4BXC, VK4KHZ, VK4NFL, VK5GZ, VK5TL, VK6RO, VK7RH, VK8HA and VK8JF.

There were 112 intruders reported using AM, 152 using CW, 152 using RTTY, 76 using other modes and 34 intruders gave identifying call signs on the air. By far the biggest single problem for the month was the number of reports of Asian CB-type activity on 28 MHz. This problem will get worse, and we want to hear about what you hear on 10 metres.

Please let us know if you are hearing the Spuri of an AM station on 14.025 MHz from about 1000 UTC onwards. We are working on the theory at the moment that it may be a result of the "Luxembourg Effect", and is the result of the effect working on two stations, one on 11.805 MHz and the other on 9.585 MHz. The "Luxembourg Effect" phenomenon was first described by two Australian physicists as an effect where a powerful station could affect the ionosphere in such a way that any other waves reflected from the affected region would acquire a modulation from an unwanted powerful station, and was most marked when:

1. the two transmitting stations were approximately on the same Great Circle Bearing from the receiver; and
2. the interfering station was geographically between the receiver and the wanted transmitting station.

Our two stations on the above-mentioned frequencies meet these requirements, and this could well be the cause of the problem. This is a difficult problem and will need further investigation.

And, onto the mode for the month — Facsimile or FAX.

FAX is designated R3C or F3C, and is a legitimate amateur mode. We cannot assume a heard FAX signal to be an intruder as it could be an amateur operator. FAX is used for the transmission of maps, charts, diagrams, etc and has a very distinctive sound, like a musical tic, tic, tic. It is virtually impossible to label a FAX signal as an intruder, unless you can decode the transmission. FAX intrusions, fortunately, are uncommon, although not rare, and we need not worry too much about them. Next month we will tie the ribbons on the current series of mode descriptions. See you then.

NEW TECHNOLOGY CABLE INTO HOMES

Homes in both Sydney and Melbourne have been involved in trials of a communication medium of the future. A pilot scheme has seen 90 houses in the Centennial Park area of Sydney and 90 in Torak, Melbourne, linked to the telecommunications network by fibre optical cable.

Telecom said that in the future enhanced services likely to be offered will include one-way video two-way voice for home shopping and education and two-way links for video phones, community video conferencing and transmissions between personal computers.

Telecom network engineering spokesman, Mike Harrison said, "It will allow a lot more people to work from home."

"All these uses would not be possible on the existing copper wire network."

Those in the pilot scheme with a basic fibre-optic line have simultaneous access to several facilities such as multiple phone channels, viatel and security systems. Some of the homes had a low speed data channel whilst others have a 2mbit data channel.

The costs of optical fibre cable distribution is expected to be similar to conventional copper cable in the 1990s when optical fibre cables go into widespread use.

Telecom was also moving toward using the new cable for business communications in capital cities, linking the cities and trans-ocean fibre optics would also link countries.



Contests



Frank Beech VK7BC
FEDERAL CONTEST MANAGER
37 Nobelius Drive, Legana, Tas. 7251

CONTEST CALENDAR

APRIL 1988

9 — Israel ARC Contest
23 — 24 Swiss Helvetia Contest

MAY 1988

14 — 15 CQ M Contest (Rules this issue)
26 — 29 CQ WW WPX CW Contest

The Oceania results for the 1986 USSR CQ M Contest are as follows:

SINGLE OPERATOR SINGLE BAND

VK4TT	4275 points 14 MHz
VK5AGX	2210 points 14 MHz
ZL3AGI	228 points 14 MHz

SINGLE OPERATOR MULTI-BAND

VK4XA	15575 points
VK2BQQ	8502 points

The rules for the 1988 CQ M Contest are as received from Box 88.

1. OBJECT — To strengthen friendly relations among radio amateurs of the world.
2. DATE and PERIOD — The second full weekend of May annually, from 2100 UTC Saturday to 2100 UTC Sunday.
3. ELIGIBILITY — All licenced amateurs and SWLs, world-wide.
4. CONTEST CALL — CQ M (means "Peace to All").
5. MODE — CW and SSB (no cross mode).
6. BANDS — 3.5, 7, 14, 21, 28 MHz and Mode A may be used according to IARU band plans. QSOs through Mode A count as a separate additional band.

7. CATEGORIES —

- A) Single operator, single band.
- B) Single operator, multi-band.
- C) Multi-operator multi-band single transmitter.
- D) SWLs (listeners).

NOTE — Only one transmitted signal allowed at any given time. Multi-operator multi-band single transmitter stations are only allowed to change band once per time for a period of 10 minutes.

8. EXCHANGES — RS/T plus QSO serial number starting at 001.

9. QSO POINTS — Each QSO with own continent counts as one point and with other continents, three points.

Listeners logging both call signs and one number score one point, both call signs and numbers — three points.

10. MULTIPLIER — The multiplier is the number of different countries ("R-150-S" country list) worked on each band. Listeners have not got multipliers. A station may be worked once on each band only. QSOs within own country count for multiplier only.

11. SCORING — The total QSO points multiplied by total multipliers from all bands added together.

12. AWARD — The winners in each category in each country will receive a diploma, and the winners and two runners up will be awarded medals also. All non-USSR stations working at least 10 USSR stations will be awarded badges.

13. DEADLINE — All entries must be postmarked no later than July 1 of the current year.

Logs must be sent to: Krenkel Central Radio Club of the USSR, CQ M Contest Committee, PO Box 88, Moscow, USSR.

NOTE — The various awards issued by the Krenkel Central Radio Club of the USSR may be claimed on the basis of these logs if application is made when they are submitted.

NOTE FROM FCM — The (R-150-S) country list mentioned in the above rules appears to be the same as the DXCC list.

1987 ROSS HULL MEMORIAL CONTEST RESULTS

The VK5 Division is to hold the trophy for this year!

The overall winner this year was VK5NC with a total score of 1796 points, followed by VK3AAU with 1588 and VK3AUG with 1400 points.

The highest scores in each of the six Maidenhead Locator Fields that were activated, according to the logs received are as follows:

QG winner VK4YZ*
QE winner VK7JG*
PG winner VK4KHQ*
RF winner ZL1TZA*
RG winner FK1TS*
QF winner VK5NC*
CALL SIGN

SCORE

VK5NC	1796
VK3AAU	1588
VK3AUG	1400
VK3BBB	1259
VK4YZ	987
VK2OOD	938
VK2BHO	725
VK7JG	694
VK3XRS	594
VK7ZHA	540
FK1TS	514
VK32XY	447
VK3KKW	437
VK5LP	423
VK4ZRC	409
ZL1TZA	309
VK2TR	212
VK4KHQ	102
VK7LZ	102

LOCATOR SQUARES

29
28
23
22
19
18
14
12
11
10
10
8
8
8
6
6
4
2
2

* Indicates certificate winner.

The number of entries has remained static and I will accept the blame this time around, but will expect a lot more stations to participate in the next Ross Hull Contest, who will receive more promotion. The rules for the 1988 contest will remain the same but the duration will be shorter.

The standard of logs submitted was very high and all the comments received have reinforced my belief that we are on the right track in our bid to make this contest more interesting for the majority of amateurs and I believe that it will be very difficult for the same station to be a certificate winner two years in succession!

COMMENTS RECEIVED FROM THE CONTESTANTS

Firstly I would like to congratulate the contest committee for an excellent Ross Hull Contest during 1987/88 and for their plain courage in bringing in the new rules and regulations. I thoroughly enjoyed every minute of it despite my age of 75-and-a-half years. The contest got off to a slow start at first, but as soon as everyone realised the meaning of the squares it took off very well indeed.

Some suggestions if I may.

1. I would like to see more reminders in AR and on the Sunday broadcasts prior to the starting date, as I was amazed at the number of stations who were unaware of the contest.

2. In my opinion the "locator square" was a great success and caused considerable interest. Keep it going.

3. Perhaps it may be an idea to include UHF bands in future, in order to keep the multi-band boys happy.

4. I am not in favour of band multipliers as I think this was one of the factors which caused a serious decline in previous contests.

5. I am not sure of contacts via satellites as I have heard it argued, but why not repeaters?

6. I prefer to have the contest remain for its present duration rather than be reduced. I realise it is an impossible task to please everyone and would be happy if the next contest was run on similar lines. VK3AUG

Although not as active as I hoped to be this year, I enjoyed my participation. The use of Maidenhead locator squares I believe is a change for the better. I

know there were and are grumbles from some stations active on 1296 MHz and above. Maybe a special division for these bands, with say certificates for winners in each State and national, would recognise their efforts and keep/stimulate activity and experimentation on these bands. VK32XY

Pity the contest wasn't two days earlier as I worked VK2, 4, 5, JA9 and P29 on 1712 and 1912, including a two-way RTTY contact with VK2YVG in Broken Hill, all on six metres! I ran my keyer for a total of 96 hours 44 minutes during the contest on 52.060 and 52.050 MHz. I also heard the Darwin beacon at 0040 on 31/88 but couldn't make Darwin up! Maybe better luck next time. VK4KHQ

That's the spirit... FCM

This contest really got me hooked, once I started, the longer it went the harder I worked to gain those extra points. It was a very enjoyable contest and very fair. The point of starting your numbering from 01 each UTC day needs a bit of explaining to some stations but for the most part stations know what to do. My only disappointment was the lack of stations working the contest and the difficulty in getting that DX coming in. Thanks again for the great contest. I will be back again next year! VK4YZ

My entry for the Ross Hull Contest must be the smallest you will get. See you next year. ZL1TZA

I like the idea of using locator squares, I will be asking most of my contacts from now their locator square to see how many I can work before leaving here. I think it is a good way of injecting a little more interest into 6, 2, 70 cm, etc. Starting ladders would be a good idea but also some awards for say 50 locator squares as a basic award with endorsements for 60, 70, etc. I imagine it would be quite difficult to work 50, it will be interesting to see the highest number worked during the contest. You could also have a separate, more prestigious award for 100 squares worked. When I get all my QSLs in for this season I will be getting out the atlas and see how many I have worked, anyway, I enjoyed the contest although six metres was not very good to me. Do not shorten the period of this contest, the three or so weeks now is a must. FK1TS/VK3XGK

Just a short note to let you know how much I enjoyed the Ross Hull Contest, despite the very poor Sporadic E season we suffered. Unfortunately my log is not eligible as the majority of my contacts during the contest were made from a portable station operated jointly by two other operators. Nevertheless, I had a good time providing contacts for others and logging the odd locator square. I must compliment your courage in biting the bullet by introducing the grid square locator system to this contest. It provided a novel twist and I am sure has finally established the use of grid squares in Australia, even after all these years many stations were still looking for new grid squares. Pay no attention to the handful of knickers. VK3BRZ

It was unfortunate that coinciding with the introduction of locator squares to the contest that we should have one of the worst Es seasons ever. Six metres was a write-off and also two metres, except for the usual tropo contacts. In the absence of the usual large number of six metre contacts, most activity had to be confined to 144 MHz and above. As with any major changes to the rules, the use of locator squares for the first time caused quite a degree of confusion, especially from those who are not VIA members. Many did not know their own locator squares and these had to be worked out by those having the necessary information. Some operators said they would wait until after the contest before spending much time on the air! This may have been different if there had been Es around. I am not sure the locator square system is really the best idea for the Ross Hull Contest. There is evidence of mountain top operating in response to in advance scheduling of Ross Hull contacts! I am not against locator squares for contests as such, but believe it should be an ongoing thing such as for DXCC, Australian record tables, etc, but not for the Ross Hull Contest. As the result of considerable on-air

discussions. I am slowly coming around to agree that a much shorter contest may be desirable, with one half in the summer and the other in the winter, the two being added together for a final result. Within certain limitations, the idea of scoring at the rate of one point per kilometre irrespective of band has some merit and I am currently looking at this idea. I am sure the Federal Contest Manager will be disappointed with the logs he receives this year, which might indicate an overall lack of interest even worse than before. But, in fairness, we must take into account the poor conditions this year, the impact of the locator squares system, as well as the perennial situation that the contest is limited to WIA members only. I earnestly hope the Ross Hull Contest will continue in one form or another. I will endeavour to expand on some of my views direct to the contest manager as well as through my columns in AR. In the meantime, I say thank you to the Federal Contest Manager for an honest attempt to some real changes, but I think you will be disappointed. VK5LP

Well, that is it until next time! I think that the majority of contestants seemed to approve of the new Ross Hull rules and regulations. I was quite pleased to receive the same number of logs as last year for the 1986 contest in view of the rather poor conditions that prevailed during this contest and the new type of contest exchange introduced, I am satisfied. *

A disappointment was the absence of an entry from VK6. Could this be a reaction to the Remembrance Day Contest which has evolved into a more or less VHF only contest over in the west due to the existing RD rules. Perhaps if six metres had been open we would have had a number of entries from VK6. If six metres had been open we would have received many more logs. Is that wishful thinking? Next year will tell!

SUPER PLASTICS

A team of scientists at the National University of Singapore are trying to develop a breed of super plastics that can carry electricity cheaply and reliably.

By the 1990s these experts predict electrically conductive plastics being used in lightweight batteries, switches, printed circuit boards, and a range of electronic devices.

SOUTH KOREAN SUPER CHIP

South Korea, which exported \$1.92 billion worth of semiconductors last year, has now developed its own super chips.

It will become the third country after the United States and Japan to make the super-chip which can store as much information as 30 newspapers.

The four megabit dynamic random access memory (D-RAM) chip is the most sophisticated semiconductor commercially available.

The chips were jointly developed by the government-backed Korea Electrotechnology Telecommunications Research Institute and three leading local electronic firms.

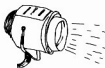
CORDLESS PHONES BANNED

Concern about interference from cordless telephones has led DOTC to have these items made a prohibited import. Tourists had been assured by some overseas merchants that their products are suitable for Australian use.

But, those available overseas often operate on frequencies used in Australia by television Channel 0, aeronautical, emergency and other radio communications services.

DOTC says only those cordless telephones on sale in Australia, which have been tested and labelled under compliance requirements for Australian conditions, can be legally used.

Anyone suffering interference from a suspected illegal cordless telephone should immediately contact the DOTC.



Spotlight on SWLing

Robin Harwood VK7RH
5 Helen Street, Lancelton, Tas. 7250

Autumn has arrived and already daytime conditions have significantly improved. The solar flux is rapidly climbing upward, although the A-index, which indicates the level of geomagnetic activity, can fluctuate dramatically. I find the daily propagational reports, via Radio Australia, quite indispensable, and much easier to understand than the WWW reports at 18 minutes past the hour. Mike Bird's reports are heard from Monday through to Saturday at 0425, 0827, 1227, 1625 and 2027 UTC, on the usual RA outlets. On Sundays there is a weekly summary of propagational conditions in *Communicator*, RA's weekly communications magazine.

And whilst we are on DX magazines, I have some updated information so you may keep abreast with the fast breaking shortwave scene. As I have already mentioned, RA has re-titled their communications magazine and has also extended it to 27 minutes. This meant that the program had to be re-timed and it is now heard at the following times: 0230, 0730, 1230, 1730 and 2030 UTC, Sundays. The easiest release for me is at 0730 UTC, as the Pacific Islands Service on 5.995 MHz from Shepparton booms in here. However, those living in metropolitan areas are able to get local studio quality as the ANS's Radio National relays RA between 1400 and 1930 UTC on Sundays.

HCB's DX Parlyline has also been re-scheduled to 1030 UTC and has also been reduced to Mondays and Saturdays. The best frequencies are 6.130 and 11.925 MHz. As I am typing this, I came across this program at 0230 UTC on Tuesdays, beamed to North America on 11.775 MHz, but it was a marginal signal. If you do miss the 1030 release, conditions on 11.775 MHz may be surprising in winter. Incidentally, HCBJ, on 11.835 MHz in Russian, really booms in here, yet it is not surprising as they are using their 500 kW sender compared with only 100 kW on 11.775 MHz.

Another DX program for listeners within this region is the *Pacific DX Digest* over KTWV, Trans World Radio in Guam. It is heard at 0945 UTC on Fridays on 11.805 MHz, which is received well here. Other well-known programs remain unchanged, such as *Waveguide* on the BBC World Service, *Media Network* on Radio Netherlands and *DX Merry-Go-Round* on Swiss Radio International.

DXers and SWLs in Asia and the Pacific are trying to persuade Radio Canada International to include *SWL Digest* on their Asian English-language program via Radio Japan's Yamata relay. RCI have only scheduled a 30 minute English release in the morning and evening with no plans to include it. Incidentally, the RCI program commences on the fourth of this month at 1200 to 1230 UTC on 15.290 and 17.810 MHz, from Yamata and from 2200 to 2230 on the single channel of 17.885 MHz, which is followed by French at 2230 UTC. Japanese programs from the CBC's Vancouver studios are on at 1300 to 1330 and 2200 to 2230 UTC on 6.150 MHz.

I know that RCI are anxious to hear how reception is via the NHK Yamata site, so you can forward your reception reports to Radio Canada International, PO Box 6000, Montreal, Quebec, Canada, H3C 3A8.

If you are hearing the Spanish Foreign Radio at 1000 UTC, in Spanish, on 7.165 MHz, it does not mean 41 metres is open to Europe at that time. The transmissions are directed to Japan in Spanish, but are actually coming from Kunming in the People's Republic of China. The Spanish and Chinese governments signed an agreement at the beginning of this year to exchange programs via

their senders. Madrid is also on 11.870 MHz via Kunming to the Philippines at 1100 UTC, with excellent signals. Radio Beijing is using Spanish senders in the Canary Islands to transmit to North America, in English.

This sharing agreement is the third Radio Beijing has entered into. They commenced with Swiss Radio International in Berne last year, and then updated Radio Mali's senders in Bamako, West Africa to relay Radio Beijing's programming to Africa and South America. This agreement, however, is a one-way affair unlike those made with SRI and the Spanish Foreign Radio (REE).

By now, I should have more time to get involved in SWLing as I have stepped-down from the VK7 Divisional Council after a two-year stint. Conditions are rapidly picking up and the latest indications are that the next maxima for sunspots is in 1989-1990 — only 18 months away!

Two interesting utility stations recently logged have been in the news. The first one was the Canadian ice-breaker, *Lady Franklin*, call sign VOCR logged on February 3 on 14.415 MHz. She was hurriedly chartered by ANARE when the famed *Nella Dan* sank off Macquarie Island. The second signal was GBT, the QE2, which was heard on February 7 and 14, once on ARQ and the other on USB within the maritime allocations.

Net month, I hope to be reviewing both the *World Radio TV Handbook* and the *International Broadcasting Handbook*. Until then, the very best of DXing and good listening!

—Robin VK7RH

MAGPUBS



Founded in 1910.

T-SHIRTS

WINDCHEATERS

GOOD RANGE OF TECHNICAL BOOKS

Now available from your

DIVISIONAL BOOKSHOP



SHARING THE SHACK

In earlier times it was uncommon for a woman to hold an amateur radio licence. The wife was not encouraged to show an interest in the mysterious array of bits and pieces, for the weird noises often produced when those bits and pieces were put together, that were so much a part of her otherwise neat and orderly home. If she were foolhardy enough to attempt an entry to his domain, where chaos ruled supreme, she was, in most cases, gently but firmly shunted to the door with a murmured "You wouldn't understand any of this, dear," to return to the civilised world of children, dogs, cats, cooking, washing, etc.

Those times are gone! The number of married couples jointly involved with amateur radio is growing continually, and in many cases whole families enjoy this fascinating hobby of ours.

This no doubt has its advantages and disadvantages. Sharing the radio shack and equipment requires plenty of give and take, but on the other hand, amateur radio becomes as much a part of the household as the family cat, and is not booted out the back door to take up residence in the garden shed.

What can be more pleasant than a shared hobby?

CLARA (the Canadian Ladies' Amateur Radio Association) is at present very interested in families involved with amateur radio, and issue a special Family Certificate (see details below).

CLARA FAMILY CERTIFICATE

Families must reside in Canada. Work two or more members of the same family to get family status. They need not live at the same address. All bands and modes. All QSLs dated January 1975 or later may be counted. Log sheets must also show the full names and relationships of contacts. One point is allotted for the first member of the family and two more points for each additional member worked. Remember two or members from the same family must be worked. For this certificate 22 points are required. Endorsements are issued for each additional 22 points.

Example:
Hallie du Freez VE6AUP — 1
Buddy du Freez VE6ANC — 2
Tavis du Freez VE6BMC — 2
Total of five points

Pauline Burt VE3LQA — 1
Jim Sweet VE3AAI — 2
Glenn Sweet VE3GCI — 2
Total of five points



Photographed at the ALARA-meet in September 1987 are Jenny Warrington VK5ANW, Vicki Shaw ZL1OC and Marilyn Syme VK3DMS. Marilyn is ALARA President.

QSLs must be in your possession and the log must be verified by one other currently licenced amateur. Send S2 and log data, complete with full name and relationships to CLARA Certificate Custodian.

The Canadian Amateur Radio Magazine, November 1987, "YL News and Views" list a number of well-known DX couples from all parts of the world:

Christel DF1LV and OM Lothar DF1LU, Deckert. (Christel is an ALARA member).

Ery HS1KY and OM Piya HS1KO, Malakul.

Aola ZL1ALE and Dave ZL1AMN, Johnston. (Aola is an ALARA member).

Darleen WD5QX and Joe WD5HIL, Magen. (Darleen is an ALARA member).

Lea L1TTL and Jules LZ1TJ, Toussaint.

Clare E1TCW and Ken E19AB, Dixon.

Eisa 8P6MH/9Y4XL and John 8P6KX/9Y4JW, Webster.

Diana ZS6GH and Reg ZS6J, Green. (Diana is an ALARA member).

Neveen AP2YL (first woman licenced in Pakistan) and Ali AP2AL, Munir.

Diana G4E2I and Richard G4DZJ, Hughes. (Diana is an ALARA member).

Margaret G03RFK and Doug G04RFK, Dodd.

Funi JA1AEO and Abe JA1PK.

Ellen LA5H and Ken LA3DO, Grandel.

Kirsti VK9NL and Jim VK9NS, Smith. (Kirsti is an ALARA member).

This is, of course, only a fraction of the married couples actively engaged in the hobby of amateur radio. We certainly cannot omit the globe-trotting Colvins, Iris and Lloyd, from any list of this nature. I would also like to add our own Mavis VK3KS and Ivor VK3XB, Stafford, who have contributed a great deal to amateur radio. The list could go on and on.

One thing is certain, amateur radio can really be a family hobby!

MAVIS STAFFORD BICENTENNIAL TROPHY

The response to the Mavis Stafford Bicentennial Trophy (details March AR) has so far been most enthusiastic, and indications are that it will be keenly contested.



Maria McLeod VK5BMT, ALARA-meet Co-ordinator.

ALARA contacts for the Trophy must be made between January 1 and December 31, 1988 (UTC).

This trophy, together with the Dutch YL-Year 1988 Award and WARO Century Award tend to make 1988 "YL Year" as well as Australia's 200th birthday.

50 YEARS ON AIR

Mary (Bobbie) Lilian Hill VK6MH, was born in 1906. She married Stan Hill in 1932. They have two married sons and four grandchildren.

Bobbie and Stan were both licenced in 1937 whilst living at Wiluna, WA, (1200 kilometres NE of Perth) and, like other amateurs at that time, taught many young men Morse code to help them in the Services.

Bobbie's AOCF Certificate is numbered 1976, dated August 27, 1937, and shows she passed Morse code at 12 WPM. Bobbie preferred CW although she would join Stan on phone for some QSOs.

Bobbie has not been on air for some time although she liked to listen in. She enjoys reading the ALARA newsletter and hearing about the girls' activities. She is still an amateur at heart.

Bobbie was delighted to receive a dried flower arrangement from ALARA congratulating her on 50 years in amateur radio and sends her sincere thanks. She had to explain to the nursing staff at the hospital what it was all about!

YL ACTIVITY DAY

It is pleasing to see an increase in the number of YLs on air on the sixth of each month — YL Activity Day. I was thrilled to catch up with Diana G4E2I on February 6, with reasonable signals, which enabled us to have a good "rag-chew". It was pleasing also to talk to Jean GV0APR (an ALARA member) for the first time. European propagation does appear to be improving.

There were, in addition, more VK and ZL girls, and at least one Japanese and one German YL on air during the time I had available that day.

Please make an effort to come on air on the sixth of the month, if only for a short time. If you do not hear anyone on the YL Activity Day frequencies (see February AR), call "CQ YL" as other may be listening.

ALARA AWARD UPDATE

No/DATe	NAME & CALL SIGN
132/October 1, 1987	David Stevens L20508
133/October 1, 1987	Bruce Bliton VK1BEB
134/December 15, 1987	Liz Randall VK3PSG

ZL THELMA SOUPER MEMORIAL CONTEST 1988

Saturday and Sunday, April 16 and 17, 1988 from 0700 to 1000 each evening. All contacts on 80 metres phone and CW. YLs contact YLs and OM's. One contact with each station permitted in each half-hour period. Call "CQ WARO Contest". Exchange report, serial number (commencing with 001) and name.

To qualify as a multiplier a WARO member station must have at least 20 contacts. A bonus station using the WARO call sign, ZL2YL, will be in operation for random periods each night of the contest; if worked it will count as a multiplier once on each night of the contest.

To qualify, enter date at beginning of each evening, each log entry must contain time of contact, call sign of station worked, cipher sent, cipher received and name of operator contacted.

Score one point for each contact, multiplied by the number of WARO members and bonus station if worked. Logs to have each contact claimed as a multiplier underlined.

Include a summary showing your call sign, name and address, number of contacts, number of

WARO members worked, your score and declaration that all radio regulations have been observed.

The highest scoring WARO member and OM will each be awarded a trophy to be held for one year. The first three WARO members, first three OM and the highest scoring VK YL operator will be awarded certificates.

Logs to reach the Contest Manager, J Gilchrist ZL2BOD, PO Box 651, Hawera, South Taranaki, New Zealand, by May 14, 1988.

Another YL contest to watch for is the DX YL to North America YL. CW will be held on April 6-8 and phone on April 13-15.

BITS AND PIECES

A barbecue for ALARA members will be held at the home of Liz VK3PSG, on Sunday April 17. Weather will not be a problem, children welcome, but no dogs please. Arrival time about noon. Liz will supply hot water for tea and coffee. Please bring your own meat and salads, etc. If you think you can attend please ring Liz on (03) 723 7744.

Bev VK6DE and OM Brian VK6AI, planned a touring holiday in New Zealand meeting many of their ZL friends along the way. We will be interested to hear all about your trip, Bev.

Bev also reports that there are now 34 licensed YLs in VK6.

It is sincerely hoped that by the time this goes to print Gill VK6YL will be literally back on her feet again and fully recovered from the accident which resulted in a broken leg.

Congratulations to Marjorie VK3HQ, who recently celebrated 55 years as an amateur radio operator. She was pleasantly surprised to receive a specially inscribed silver bud vase from ALARA.

Sincere sympathy is extended to Joy VK4VFJ, on the death of her sister.

NEW MEMBERS

Welcome to ALARA:
Ree VK2CAK, Jean VK6JMP and DX member, Barbara CPSLE.

Congratulation on upgrading to Noela ex-VK4MBP now VK4KCU.

Until next month, 7/33, Joy VK2EBX.

NEW KENWOOD TRANSCEIVER

An all-band, all-mode 100 watt HF transceiver, which can also give 10 watts output on six metres, has been announced by Kenwood.

The company's new TS-680S transceiver has dual VFOs, 31 memory channels, programmable scanning, if shift, dual noise blankers, RIT and FM squelch.

A new feature is a programmable band marker which Kenwood says can be used to mark band edges to prevent out-of-band operation. It is not known when the model will be available in Australia.

SUPER CHIP

The world's fastest dynamic memory computer chip has been developed by IBM researchers who say it can send and receive information at a rate of 20 billion units per second.

The chip, which allows computers to think three times faster, is expected to have great application in medicine and engineering.

It will enable big improvements in video screen images such as the development of two and three dimensional graphic data and moving images.

OMISSION

There were 11 proposed motions for the 1988 Federal Convention published in AR, February (pp 27-28). They were attributed to VK4 and VK1, but without indicating which Division had proposed which motion. In fact, only the last motion listed (re the 20 metre band plan) was from VK1, with all the rest from VK4.



AMSAT Australia

Colin Hurst VK5HH

8 Arndell Road, Salisbury Park, SA. 5109

NATIONAL CO-ORDINATOR

Graham Ratliff VK5AGR

INFORMATION NETS

AMSAT AUSTRALIA

Control: VK5AGR

Amateur Check-In: 0945 UTC Sunday

Bulletin Commences: 1000 UTC

Primary Frequency: 3.685 MHz

Secondary Frequency: 7.064 MHz

AMSAT SOUTH WEST PACIFIC

2200 UTC Saturday

14.282 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian Elements from the AMSAT Australia Net. This information is also included in some WIA Divisional Broadcasts.

PHASE 3C UPDATES

With the launch of Phase 3C in the foreseeable future, the following items of news are presented, along with an item highlighting the problems currently being experienced by Phase 3B, better known as OSCAR 10.

Newest OSCAR Prepared for June Launch

Final preparations are being made prior to shipping AMSAT's Phase 3C spacecraft to South America for launch. The most powerful OSCAR ever built will be lofted to orbit from the European Space Agency's Kourou, French Guiana launch site. The launcher will be an Ariane 4 rocket, the largest ESA has ever flown. This will be the 22 flight and is designated V-22. The 300 pound AMSAT spacecraft, one of three satellite payloads on Ariane, will eventually operate from a high elliptical orbit, completing just over two orbits of earth per day. The new AMSAT satellite contains four separate transponders (repeaters) covering frequencies from 145 MHz to 2.4 GHz. A packet radio transponder is one of the four. One transponder will be capable of carrying more than 75 simultaneous QSOs. Another transponder uses FM and could be suitable for beaming bulletins for relay by terrestrial VHF repeaters. Phase 3C will receive its OSCAR designator number after it is successfully operating in orbit. That should occur about 30 days after launch. The satellite should operate for more than five years. Upgraded computer memory chips are "hardened" for the severe radiation encountered in orbit. This satellite is the third in the Phase 3 series. Phase 3B became AMSAT OSCAR 10 upon its successful launch in 1983. On-air coverage of the June launch will originate with a network of stations around the world including ARRL Headquarters Station. WIAW. Repeater systems can link into the network via landing circuits. Besides routine QSOs, Phase 3C will be used for so-called "Techno-Sport" activities. These on-air competitions emphasise technical skills and recognise superior ability with plaques and awards. The AMSAT "ZRO-test" tests a station's receive sensitivity by sending successively weaker signals from the satellite. The new "SatFox Test" is a version of fox and hound transmitter hunting done by satellite. More Techno-Sports are in the planning stages. AMSAT Phase 3C is a joint project of AMSAT North America and AMSAT DL, with additional contributions from other AMSAT affiliated organisations. The project cost more than US\$400,000. Initial design of the Phase 3 generation of OSCARs began in the mid-70s.

PHASE 3C LAUNCH EFFORTS CONTINUE
Momentum is increasing on several fronts leading

to a launch of AMSAT's Phase 3C spacecraft in late spring. Whilst the actual launch date has apparently slipped a month into late May, or early June, preparations to support the launch activities are proceeding well. These support activities include planning for the launch support team from AMSAT NA and AMSAT DL, in Kourou and launch activity coverage by the AMSAT NA's launch support team recently in Boulder, Colorado, to map out plans for their activity in Kourou. Together with the AMSAT DL team, they will accomplish the final preparations on the Phase 3C satellite after it has arrived at the Kourou launch site of the European Space Agency. They will apply thermal blankets, install the antennas, fuel the spacecraft and integrate it with the SPEDDA, the large container which sits atop the Ariane 4 launcher, and which supports and contains the payload. After integration, a minimum support team will remain on-site to monitor the spacecraft telemetry sent through the umbilical to the monitoring facility. A 24-hour watch team will assure all telemetry values remain within tolerance. This watch will continue through to launch. Major launch-related activities will be broadcast on a world-wide ALINS prior to, during and after the launch.

OSCAR 10 — TIME FOR A REST . . .

Hello to all! Just a message to tell you what experience I made with our old bird in the past few days. On Sunday, January 31, there were FMing effects again on the GB beacon and transponder signals were reported for the first time. On February 4, when I looked at AO-10, I found the GB and Transponder off, but the high power EB on with a good signal. Around 16:30 UTC, I tried to reset the IHU/Transponder, but all attempts failed until LOS. At AOS of the next visible orbit, on February 4, 1988, U.S., I could not hear anything. The satellite appeared to be dead. Later, around 20:30 UTC, I found the general beacon (GB) extremely weak transmitting PSK garbage. I then tried the reset procedure again at 20:35 UTC, with success! The GB switched back to a continuous carrier, the signal strength increased slightly and the transponder passband was also on again. But heavy FMing was persistent. In the past few days I have found the satellite in normal operation (GB and passband on), but still FMing continuously. I conclude that the power system is now operating with a near-negative power budget and the battery cannot fully charge. This probably means that the sun angle (SIC attitude) is about 10 degrees worse than estimated. When the satellite enters eclipse and there is a large transponder usage, this will probably produce random resets and unknown IHU/transponder states due to the under voltage condition. Users have to take these effects into account and should not use the transponder when the GB shows FMing effects, etc. It is time to give our good old bird a time of rest! Best wishes and 73, de Peter DB20S.

AMSAT-AUSTRALIA NEWS BULLETIN

A reminder for newcomers to the satellite ranks, that the Sunday Evening News Bulletin presented by Graham VK5AGR, (refer schedules at the head of this column) continues to be the best source of up-to-date and reliable news available anywhere in the world. With the impending launch of Phase 3C, the latest launch information, orbital elements, telemetry formulae, etc, will be disseminated by Graham as they come to hand. Stay tuned.

de Colin VK5HH



QSP

REPEATERS & BEACONS

Tim Mills VK2ZTM
FTAC Beacon Co-ordinator

SEMICONDUCTOR PIONEER DIES

Russell S Ohi N6DJG, credited as the father of the modern semiconductor industry, recently became a Silent Key.

Whilst studying the anomalous behavior of a bar of silicon, he discovered that a photovoltaic effect was generated in the bulk of the material.

Russell found that the photo sensitivity occurred at the junction of two types of silicon, and named these types N and P. The function is now known as the PN junction. This breakthrough made the invention of the modern transistor possible, and additionally became the basis of the solar cell.

He received 82 US and 50 foreign patents, and published five scientific papers.

A profile on Russell Ohi, who first became licensed in the early 1920s, was published in QST magazine in May 1981.

—From the ARRL Letter

COMMEMORATIVE CALL SIGN

As part of celebrations for the centenary of local government in the town of Birkenhead, New Zealand, a commemorative call sign will be on-air.

Watch for ZM1BCC operating from the Public Library of Birkenhead City Council offices, April 15 to 25. HF operation will be during office hours, with extra time planned on Thursday 21 and Friday 22.

Organiser Ray Tout ZL1BXC, says ZM1BCC will QSL mostly via the bureau.

US PACKET RADIO CHANNELS

The ARRL has adopted a number of recommendations made by its committee on amateur digital communications.

These include:

1. RTTY sub-bands should be used for general packet radio communications.
2. The following frequencies outside normal RTTY sub-bands will provide usable automatic message-forwarding channels:

Inter-continental message forwarding: 3.594.3, 7.039.3, 10.145.3, and 14.102.3 MHz (with 14.104.3 MHz as backup).

Intra-continental message forwarding: 14.108.3 MHz (with 14.106.3 MHz as backup).

North America message forwarding: 3.607.3, 7.091.3 and 10.147.3 MHz.

The 20 metre frequencies are considered experimental. Use of 30 metre frequencies is on a non-interference basis with fixed stations on this shared band.

neighbours. We must learn to live with them. We cannot keep moving systems out of channels above 147 MHz, otherwise we will just create a guard band which some commercial will request they move into. Wherever possible we must continue to install systems above 147 MHz. Design better receivers, select sites that do not have pagers but use all of our bands or lose them! In those call areas with nothing above 147, put some systems.

Eric VK2YV/P29ZEF who is the president of the PNGARS, advised late last year on the beacon and repeater position in P29.

BEACONS

P29BPL, on 52.013 MHz — 23 watts omnidirectional cross dipoles, 158 metres ASL at Port Moresby.

P29BTO, on 144.105 MHz — 15 watts vertical quarter-wave ground plane, 97 metres ASL at Port Moresby.

TWO-METRE REPEATERS

P29RAE, 6650 with 20/5 watts on Mount Albert Edward, 4100 metre range over 200 kilometres. 30 second time out, hifo remote switching, remote shut-down, solar powered.

P29RBI, 6850 with 20 watts on Bougainville Island, 402 metres. To serve the Arawa and Panguna region. Undergoing testing in late October 1987.

P29RPM, 7000 with 12 watts on Burns Peak, 380 metres. Serving Port Moresby using an isopole antenna, mains and battery backup.

P29RWH, 6900 with 28 watts on Mount Keegum, 2000 metres serving the Western Highlands region. Was being tested at Port Moresby in December 1987 before installation at the site.

70-CENTIMETRE REPEATERS

P29RHB, 8800 with 16 watts on Hombrums Bluff, 723 metres. Serving Port Moresby and hinterland using a directional antenna — bears 245 degrees.

All repeaters except P29RAE have three minute time out. Mains powered with battery back up. The beacons also have battery backup.

Eric reports that there are about 138 amateur licences issued in P29 of whom about 25 to 30 are active. He also mentions that pagers do exist there but on a higher frequency than in Australia.

✉

The expansion of paging networks, in particular those of Telecom since their channels start adjacent to 148 MHz, is a continuing concern in VK2. The question which now comes up is whether there is the same expansion in other States? Would State Repeater Committees please advise FTAC the number of two metre repeaters in their region which are already at or adjacent to Telecom sites with paging networks and those also at Telecom sites likely to be fitted with pagers.

The latest VK2 system to become affected is VK2RBB 7200 at Byron Bay. There has been a recent installation of a 148.025 MHz pager on the adjacent tower. The matter is being investigated and alternative channels looked at for a transfer.

The possibility of reversing the input/output frequencies of repeater systems above 147 MHz has been discussed with both P29 and ZL. Whilst there has not been the requirements for P29 to install systems above 147 MHz, they favour the idea. ZL were not keen on the idea. Whilst there is usually enough geographical separation between the respective countries, the problem may arise during the annual trans-hemisphere openings. Several times a year it is possible for the eastern Australian coastline to work New Zealand on two metres (and higher frequencies). It would be during these times that systems in both countries, using the same but reversed channel pairs, would lock up until time out is reached. New Zealand repeaters have neither time out (nor CW identification) so it would have to be the Australian system to time out and break the lock up. New Zealand also feels that the existing 31 channels above 146 MHz are not sufficient for their needs and they propose to introduce a further 19 channels between 144.725 and 145.775 MHz. Inputs 144.725 to 145.175 MHz with outputs 600 kHz up at 145.325 to 145.775 MHz. They plan also to move their beacon band from above 145 to 144.300 to 144.400 MHz. That is below the Australian beacon segment. The five channels, 144.600 to 25 kHz steps to 144.700, are planned for their packet systems. That news came from Ted ZL2TAX, FMTAG Secretary (FMTAG is the ZL equivalent to FTAC).

The important thing for Australian amateurs to remember is that, whether we like it or not, pagers above 148 MHz are there to stay and are our

SATELLITE ACTIVITY FOR THE MONTHS OF DECEMBER 1987 & JANUARY 1988

1 LAUNCHES

The following launching announcements have been received:

INTL NO	SATELLITE	DATE	NATION	PERIOD min	APG km	PRG km	INC deg
1987							
108A	Cosmos 1984	Dec 23	USSR	104.9	1021	989	83.8
107A	Cosmos 1985	Dec 25	USSR	89.6	200	229	70.4
108A	Cosmos 1986	Dec 26	USSR	88.8	274	190	82.6
109A	Ekan 17	Dec 27	USSR	23h48m	35628		1.5
109A	Cosmos 1987	Dec 29	USSR	90.2	398	208	72.9
		1988					
001A	Cosmos 1988	Jan 06	USSR	92.7	478	650	82.5
002A	Cosmos 1989	Jan 15	USSR	113.8	1433	1386	82.6
002B	Cosmos 1990	Jan 15	USSR	113.8	1433	1386	82.6
002C	Cosmos 1991	Jan 15	USSR	113.8	1433	1386	82.6
002D	Cosmos 1992	Jan 15	USSR	113.8	1433	1386	82.6
002E	Cosmos 1993	Jan 15	USSR	113.8	1433	1386	82.6
002F	Cosmos 1994	Jan 15	USSR	113.8	1433	1386	82.6
003A	Progress 34	Jan 20	USSR	88.8	277	191	51.6

2 RETURNS

During the period 64 objects decayed including the following satellites:

1987-063A	Soyuz TM-3	Dec 29
1987-003A	Cosmos 1898	Dec 25
1987-107A	Cosmos 1905	Jan 08
1987-110A	Cosmos 1907	Jan 12

3 NOTES

1987-104A Soyuz TM-4 docked with space station MIR on December 23, 1987; the space complex is linked with Kvant 1, Soyuz TM-3 and Soyuz TM-4.

1987-63A Soyuz TM-3 undocked from space station MIR on December 29, 1987, with Yuri Romanenko, Aleksandr Aleksandrov and Musakhi Manarov on board; the descent module landed 80 kilometres from the Soviet town of Arkalyk.

1988-003A Progress 34 docked with space station MIR on January 22, 1988.

—Contributed by Bob Arnold VK3ZBB

✉



Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
56 Baden Powell Drive, Frankston, Vic. 3199

During February, Department of Transport and Communications (DOTC) officers attended public meetings in each State to explain the Department's intentions relating to the devolvement of amateur examinations.

Our thanks go to the Divisions who made the arrangements for the meetings.

I was able to attend only the VK3 meeting, but I understand that the pattern was similar in other States, and issues raised were often those that had been raised elsewhere.

The VK3 meeting was attended by about 30 amateurs, ranging from those with an extended involvement in education and examination matters to others who were unaware of the current procedures or the background to the devolvement proposal.

Mr A Jordan, from the Canberra office, presented copies of two papers — a short one outlining the rationale for devolvement and a summary of the Department's intentions (see summary at the end of this column), and a longer one covering procedures for accreditation, approval of papers and conduct of examinations as well as copies of the syllabuses and sample examination papers.

PROPOSED TIME SCALE

Speaking to the papers, Mr Jordan explained that requests for accreditation and copies of examination papers for approval may be submitted to the Department after June 1, 1988, at which time the Department's Question Bank and program for generating Morse code examinations will be made available to intending examiners.

The February 1989 examinations will be the last to be conducted totally by the Department, although special examinations for handicapped candidates will be provided as necessary after that date.

During the "phase-in" period, the Department will meet reasonable requests for copies of sets of questions. Existing official papers cannot be used by others unless a different title is used — if they are titled as official papers, the present fee arrangements must apply.

The preferred method will be for those who wish to arrange examinations to prepare their own papers, either totally or from the DOTC Question Bank, and submit it for approval at least six weeks before the proposed examination date.

MAINTENANCE OF STANDARDS

This was a concern raised by over 60 percent of those responding to the original proposals.

The DOTC is sensitive to this issue, and has specified a range of quality control measures, including approval of question papers, visits to examination venues, provision for review or verification of marks obtained, and procedures for penalising any attempt at fraud or revoking the accreditation.

It will be necessary for the District Office to be notified of examination schedules, approved papers, names of authorised examiners and names of persons nominated to sign candidate notifications. The candidate notification sheet becomes the authority for the issue of the licence.

REMOTE CANDIDATES

Permission for the examiner to use other persons to supervise an approved examination will allow candidates in remote areas to arrange examinations as required. A supervisor does not need to have any knowledge of the content of the examination. Morse code testing can be carried out on cassette tapes both ways if necessary, and assessed elsewhere.

FEES

The DOTC will not charge fees, nor set a standard fee for examiners to charge. It is assumed that examiners will need to recover reasonable costs, but in most areas, market forces will have an effect.

A number of other issues were raised. Most related to the minor mechanics of organising examinations or having papers approved. I will be presenting a fuller report to the Executive as soon as possible. Copies of it will be made available on request.

It appears that the devolvement is now in progress. It is up to us to establish a system which

is acceptable to the Department, the Institute, the amateur body and the candidates.

As usual, comments from readers will be welcome.

SUMMARY

1. The responsibility for conducting amateur examinations will be devolved.
2. The Department will maintain responsibility for examination standards.
3. The Department will continue to administer examinations for handicapped candidates as required.
4. With the exception of 2 and 3 above, the Department will have no further involvement with preparing and conducting amateur examinations effective March 1, 1989.
5. The Department will continue to prepare examination papers until March 1, 1989.
6. The Department will continue to conduct examinations in remote areas and examination centres without an authorised person in the area until March 1, 1989.
7. The Department will supply examination papers to authorised persons during the phase-in period, if required.
8. The Department will provide its examination question bank to intending examiners.
9. The Department will approve examinations in accordance with the *Examination Approval and Administration* package.
10. Persons, whose examinations have been approved, may use other individuals to conduct the examination on their behalf.
11. The Department will implement a quality control program, to assure a maintenance of standards.
12. The Department has the right to revoke the examination approval, or individual authorisation, for contravention of the examination administration procedures, any other instructions, or for actions affecting the results of a candidate.
13. The requirement for the Department to conduct amateur examinations, as established by Regulation, is to be reviewed and amended as appropriate.

BT

IAN J TRUSCOTTS

ELECTRONIC WORLD

FOR ALL YOUR COMPONENT
REQUIREMENTS

MAIL ORDERS WELCOME

**30 LACEY STREET
CROYDON 3136**

Phone: (03) 723 3860

(03) 723 3094

EXTENSIVE RANGE OF ELECTRONIC COMPONENTS FOR THE RADIO AMATEUR HOBBYIST

AMIDON FERRITE — CORES

RF TOROID & BALUN KIT

FULL RANGE INCL:
IRON POWDER & FERRITE
TOROIDS
COIL FORMERS, BEADS
RFI SUPPRESSION CORES
FERRITE RODS & POTCORES

— SEND SASE FOR DATA

- * REFERENCE & DATA BOOKS FROM MOTOROLA, SAMS, NATIONAL SEMICONDUCTOR, RSGB & ARRL
- * ELECTRONIC KITS (incl DREW DIAMOND'S PROJECTS)
- * RANGE OF MURATA CERAMIC FILTERS & RESONATORS



Pounding Brass

Gilbert Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

"Giddy Morsiacs".

Last week I experienced the horror of being blinded by an accident at work. Thankfully things have improved somewhat and the eye specialist says that everything will be okay. Stumbling around in the dark for a few days gave me plenty of time to think about the blind amateurs I know, and how hard the everyday jobs become, not to mention operating in the shack. I missed the WIA broadcast because I didn't know the time. I must have tuned around parts of the band I had never seen before, let alone on a Sunday morning, a time when I am usually outside mowing lawns, etc. To cut a long story short, I ran across a net running on 7 MHz, or thereabouts, and spent a while listening before making a bit of a fool of myself and actually joining in. Anyhow, Geoff Butterworth VK3ED, was kind enough to send me some information about the net, so this month I will pass on what I have learned about nets and their operation.

You may know that there are a group of QN codes especially for net operation (I have a list on my wall), and Geoff has supplied the following list. They certainly save much time.

The CW Net (CWN), began as an alternative to round table sessions (like the Friday high speed net) which are often difficult to enter and leave, and, which because of their sometimes clanish nature, can seem forbidding to newcomers. Whereas, in a round table of 10, a station has to wait nine overs for his turn, in the CWN approach you can have as many QSOs as you wish, and on the average one would be in the transmit mode nearly half the time.

The CWN is in no way exclusive. It makes no demands on members because it has no 'members' in the usual sense. It is an organised activity, however, where operating procedure is concerned, and thus offers the added benefit of possibly improving the general standard of Morse operation.

Being a net, it must have a net control station (NCS), whose function is to record the stations who call in and to pair stations for QSOs. The NCS begins the net (see QND), maintains order, and is always available on the same frequency to facilitate reporting in and out. It remains on for the whole session and concludes it (see QNF). Following the end of each session those interested can take part in a post-mortem discussion on 7.040 MHz SSB.

To report into the net any Sunday, merely call in sometime between 0930 and 1130 on 7.025 MHz and listen for the station calling CQ CWN QNI. Give a short call and report in with QNI. Then wait until he calls you again with a station for a QSO. Do not forget to return after each QSO to let the NCS know whether you would like another one or would like to be excused from the net.

In the course of a session each Sunday, any station who thinks they would like a turn of being NCS lets it be known to the NCS for that session. In this manner, there is no pressure on members to take a session, yet those who would like to can do so. An efficient logging system has been evolved which makes the work of NCS almost "child's play" and this procedure is available to those interested.

NOTES ON THE USE OF QN SIGNALS

1. The QN signals listed are special ARRL signals for use on amateur CW nets only. Other meanings that may be used in other services do not apply.
2. Some QN signals are for use by net control stations only, these are marked with an asterisk. Others have slightly different meanings when used by the NCS and net stations. In this case, the meaning when used by the NCS is marked with an asterisk.

3. Some QN signals have two meanings, the difference depending on how, or by whom used. Eg: when used as a preface to transmission of a message, carries the first meaning; when used by a station reporting in to the net, (W9NCS de W9NET QNI QNC), it carries its second meaning.

4. QN signals are never followed by a question mark, even though the meaning may be interrogatory.

5. Do not use QN signals on phone nets. Say it with words. (This should apply to all Q signals ... VK3CQ).

6. Use QN signals in nets only. They are not for use in casual amateur conversations.

7. Make frequent use of standard Q signals in traffic nets, for meanings not covered by QN signals. Eg: QRU, QRV, QSV, QTA, QTB, etc.

SPECIAL ARRL QN SIGNALS FOR NET

USE

QNA*	Answer in prearranged order.
QNB*	Act as relay between and
QNC	All net stations copy.
	I have a message for all net stations.
QND*	Net is directed (controlled by NCS).
QNE*	Entire net please stand by.
QNF	Net is free (not controlled).
QNG	Take over as net control station.
QNH	Your net frequency is high.
QNI	Net stations report in.*
	I am reporting in.
QNJ	Can you copy me?
	Can you copy?
QNK*	Transmit messages for to
QNL	Your net frequency is low.
QNM*	You are QRMLing the net. Please stand by.
QNN	Net control station is*
	What station has net control?
QNO	Station is leaving the net.
QNP	Unable to copy you (or).
QNQ*	Move frequency to, and wait for to finish handling traffic.
	Then send him traffic for
QNR*	Answer, and relay (or receive) traffic.
QNS	Stations in the net* (follow with list).
	Request list of stations in the net.
QNT	Leaving the net temporarily (or for ... minutes).
QNU*	The net has traffic for you. Stand by.
QNV*	Establish contact with on this frequency.
	If successful, move to and send him traffic for
QNW	How do I route messages for?
QNX	You are excused from the net.*
	Request to be excused from the net.
QNY*	Shift to another frequency (or to kHz).
QNZ	Zero beat your frequency with mine.
*	For use by NCS only.

My thanks to NCS Eric VK2BBI, and Geoff VK3ED, for their help. ... VK3CQ.

Any stations who would like a copy of the QN signals can send me a stamped addressed envelope and I will print one for their wall. In future I hope to be able to do the same for any lists and the like that appear in this column. It is computerised, that's how. And after I type in the previous 13 articles, maybe I can get back on the air!

My IC-251 has found a new home, (where it will get plenty of happy use) and our family computer has got a printer at last. Which just goes to show that Morsiacs are not really living in the dark ages by loving an old fashioned mode of communication. Don't talk to me about packet ... I really have

not got the time, but I can see the benefits and would love to see a packet column in AR.

Anything you would like to see in *Pounding Brass*, or if you can supply something of interest, please let me know. You would be surprised where some of the ideas and material come from. I have plenty of material for and from New Zealand and England, and inquiries from Canada, which is about as far as you can get — thanks to all.

I have run out of Curtis 8044ABM chips. If you want one please let me know before the end of May and I will order some from the States.

73 ... VK3CQ

NO
STANDING
ANY TIME
RADIO
AMATEURS
EXCEPTED

SPECIAL PARKING FOR RADIO AMATEURS

These parking signs will soon appear throughout Australia. The Local Government Organisation of Australia (LGOA), at its annual national conference in Melbourne, passed a resolution binding on all municipal councils.

In a news release the LGOA said the new signs are in recognition of the valuable contribution made by wireless experimenters and now radio amateurs for just on 100 years. The world has continued to benefit from the work carried out by the pioneers of wireless.

"The preparedness of radio amateurs to provide emergency communications during times of natural disasters is highly commendable, and without their help local municipal disaster plans could be inadequate," it said.

"The special parking signs are the least all municipal councils can do to recognise the unique and worthy contributions radio amateurs provided to their local community."

The LGOA said the signs are available from April 1, 1988, for erection at places visited by radio amateurs including outdoor electronics stores and radio clubrooms. Store managers and radio club officials should contact the Town Clerk or Shire Secretary of their local municipality, which is listed in the Local Government section of the white page telephone directories.

The signs will be erected free of charge. But individuals can also obtain a sign as a memento for their shack, or as a special gift to send to an overseas friend. They can be bought for \$12 each, which includes postage. The money raised through their sale will go to fund projects fostering amateur radio in undeveloped countries.

A portion of fines incurred by motorists illegally parking in areas reserved for radio amateurs will also go to such projects.

When parking near a sign do not forget to display your call sign on the dashboard of your vehicle.

The first of these signs are due to be installed appropriately in Hawthorn Road, Caulfield, Victoria, outside the WIA's Federal Office, to provide four all day free parking places.



Electro-Magnetic Compatibility Report

Hans Ruckert VK2AOU

EMC REPORTER

25 Berrville Road, Beverly Hills, NSW, 2209



This EMC-Report is reprinted from a very informative paper published in the RSGB magazine Radio Communication, May 1987, and contributed by Norm Burton.

"Were you on your radio last night?"

Angus McKenzie, MBE, FIERE, FAES, CEng, G3OSS

57 Fitzalan Road, Finchley, London, N3 3PG

Most radio amateurs have had the ominous knock on the front door, the telephone call, or the polite words over the fence about television break-through complaints. Fortunately, the large majority of complaints can be dealt with amicably and efficiently by the use of filters, and the first part of this article deals with the ways in which the strong RF signal or field is picked up by the television and video recorder installation, and produces break-through to vision and/or audio if the installation's electromagnetic compatibility (EMC) is inadequate. As the result of very many EMC tests on over a dozen television installations in 1986, it is quite clear that there is well over 20 dB difference in vulnerability to disturbance between the best and worst modern sets. It is essential to understand the different ways in which the radio signal or field gets into the installation, but first of all one has to determine that the radio transmission itself does not contain components, spurs or harmonics which are actually causing the trouble, rather than the energy on the main transmitting frequency.

SPOGS, SPURRI AND HARMONICS

Most HF VHF and UHF transmitters that I have checked in the last few years have been adequately clean, and both harmonic and spurious outputs have been no higher than —80 dB ref the maximum carrier output level. Very few HF rigs should cause trouble once you have added a well-matched lowpass filter, and only in exceptional cases have I noted spurious outputs out of band. However, just a few transmitters or transverters have shown up problems which are worth mentioning, as you may not realise just how a problem can arise.

An early 432 MHz transverter gave the most horrific spurious around 488 MHz, at only 30 dB below the carrier level on 432 MHz. The 488 MHz signal, when amplified, caused a severe problem on Channel 23 video. Upon investigation, I discovered that in the transmit mixer from 28 MHz to 432 MHz the input IF of 28 MHz was being multiplied by three, and only then added to the 404 MHz local oscillator frequency, thus producing 488 MHz. The transverter had inadequate filtering in its

RF stages, and the manufacturer had not provided sufficient RF gain, so that in order to get 10 watts PEP output it was necessary to drive the 28 MHz input fairly hard. Very careful realignment of the RF stages increased the gain considerably, improved the rejection of 488 MHz, and allowed the mixer to be driven at a much lower level, thus giving a 488 MHz output at —70 dBc, which was just about acceptable. The linear that was in use did not help the original situation, since its input circuits had a grossly excessive bandwidth.

One multiband rig included 70 MHz, modified by the importer to replace the original 50 MHz capability. The circuits had been inadequately tuned, and a serious complaint of TVI on Channel 23 proved to be due to an unwelcome amount of seventh harmonic at 491.400 MHz (70.2 x 7 MHz). A British solid-state linear amplifier happened to have a resonance around Channel 23, thus slightly exaggerating the problem when switched in. Incidentally, the same amplifier produced a second harmonic at 140.400 MHz of —30 dBc when driven to 80 watts PEP output on 70 MHz, and had to be returned to the manufacturer for them to put in a lowpass filter on the output, which should have been there in the first place.

144 MHz BAND HARMONIC PROBLEMS

You are highly unlikely to have any serious problems with harmonic radiations from 144 MHz rigs and linears, unless you live in an area which regularly has television sets tuned to Channel 34 (fourth harmonic), or Channels 52 and 53 (fifth harmonic). Fortunately, there is only one very important transmitter on Channel 34, Calbeck/Sandale near Penrith in Cumbria. Having an output of 500 watts ERP, this transmitter on BBC 2 covers a huge area including the Borders and adjacent counties. If you live in a fringe area you will have to be very careful about the fourth harmonic. The remainder of transmitters on Channel 34 are listed in the table, and are all very-low-power relays covering small fill-in areas. Unfortunately, there are very many transmitters on Channel 52 and 53, and whereas the CW and SSB end of the 144 MHz band will have a fifth harmonic in the video passband of Channel 52, FM channels from 145.400 MHz upwards have the fifth harmonic occurring in Channel 53. This is not likely to cause a problem though, as the ERP of the harmonic is likely to be very low. However, you will need to be careful if you are using high power in the satellite band above 145.800 MHz, as the fifth harmonic is right in the middle of the video carrier of Channel 53. I have not heard of any amateurs having fourth or fifth harmonic problems from 144

MHz, but it is as well to mention the possibility of one, together with a recommendation for the use of an effective lowpass filter if you are within the coverage areas of the channels mentioned.

BREAKTHROUGH AND BLOCKING PROBLEMS CAUSED BY SIGNALS DIRECTLY INJECTED INTO THE CENTRE CORE OF THE TELEVISION COAXIAL DOWNLEAD

The television antenna itself will pick up RF to varying degrees over a very wide frequency range, despite the fact that television antennas are normally directional with maximum gain in Bands 4 and/or 5. The signals will transfer to the television set or video recorder down in the inner with reference to the outer, and can cause blocking of the input preamplifier stage of the equipment. Even if this is well filtered, signals can leak through to the first local oscillator circuitry, and many other circuit areas. This type of pick-up is normally only a problem at VHF and UHF, and most of the television sets I have checked gave a comparatively adequate performance at HF. The two bands which are likely to cause most problems for this type of RF pick-up are 144 and 432 MHz. If you are active on both bands, then you may need to insert either a very good highpass filter with the knee at 470 MHz, or a less-good highpass filter, but with the addition of appropriate tuned rejection filters covering at least the 432 MHz band.

Occasionally you might have a problem on HF or lower VHF in which case a comparatively-simple highpass filter should suffice, but as often as not the problem is more likely to be due to coaxial braid or mains lead pick-up.

RF PICK-UP ON THE BRAID OF THE COAXIAL DOWNLEAD

Braid pick-up is more likely to be troublesome if the local transmission is on the lower frequency or HF bands. The pick-up levels are likely to be more severe if the length of the downlead relates to the wavelength of the transmission concerned. However, every braid acts as an antenna, and the currents that can be generated through the earth plane of the set and capacitively down to earth can be quite high. Some installations can be very immune to such currents, but poorly-designed sets can be rather vulnerable to these currents, and severe break-through to IFs, control circuits, micro-processors and audio circuitry can occur. Some form of braidbreaker is required, which will pass Bands 4 and 5, but which will block off lower frequency currents. There are several types of braidbreakers, including UHF transformer versions, capacitive breakers and coaxial loop inductors. Ferrite rings can, of course, be used combined with loops or coaxial coils to increase the rejection effect. I have measured tens of volts of RF between the bottom of a downlead braid and a mains earth, and high EMFs can generate very nasty RF currents through a set's earth plane.

Braid pick-up is not normally a problem with higher VHF and UHF, but can be the cause of a severe problem at 50 and 70 MHz.

MAINS LEAD RF PICK-UP

Although the large majority of modern television sets and video recorders do not have an earth connection to the mains, RF pick-up on the two-core mains lead can be a troublesome RF can be capacitively coupled through to the set's ground-plane, and to many of the circuits. Even if house wiring earths are well made on the mains input to

Station name/locality	Channel	Power (ERP)	Service	Poi'n
BRILLES, Shipston on Stour	34	45W	ITV	H
CAULDECK, Nr Penrith	34	500kW	BBC 2	H
CHISLETON, Avon	34	19W	ITV	V
EASTER COMPTON, Avon	34	10W	ITV	V
FINTRY, Strathclyde	34	26W	BBC 1	V
KEWSTOKE, Avon	34	12W	ITV	V
MOEL-Y-SANT, Wexham	34	115W	BBC 1	V
REDCLIFF BAY, Portishead, Avon	34	10W	ITV	H
OVER BIDDULPH, Stoke-on-Trent	34	22W	BBC 1	V
WEST KIRBY, Wirral Peninsula	34	13W	BBC 1	V
ALSTON, E Cumbria	52	400W	BBC 1	V
ANGUS, N of Dundee	53	100kW	C4	H
BACUP, Lancs	53	250W	C4	H
BEACON HILL, Torbay	53	100kW	C4	H
BIRCH VALE, SE Manchester	53	250W	C4	H
BRIGHTON, Sussex	53	10kW	C4	V
CARMEL, Dyfed	53	100kW	C4	H
DOVER, Kent	53	100kW	C4	H
HEYSHAM, E Pennines	53	500W	C4	V
KINGS WESTON HILL, Bristol	52	11W	C4	H
LES TOUILLETS, Channel Is	52	2kW	C4	H
LETHAMHILL, Ayrshire	53	250W	C4	H
REIGATE, Surrey	53	10kW	C4	V
SALISBURY, Wilts	53	10kW	C4	V
SHATTON EDGE, West Derbyshire	52	14W	BBC 1	V
STRANRAER, Dumfries & Galloway	53	250W	C4	V
STROUD, Glos	52	500W	C4	V
THORNHILL, Dumfries & Galloway	53	500W	C4	V

Notes: There are just under 60 low power stations on Channels 52/53, too numerous to mention. Additional information in *Radio and Television Stations*, 1986 available from BBC Engineering Information Department, Broadcasting House, London W1A 1AA, free of charge, but see required.

Table 1: Some television stations lying on the fourth and fifth harmonics of the 144 MHz band.

the house, all the house itself can become quite a good receiving antenna which can contribute RF into the set. Even if you have filtered the coaxial download very adequately, you can still have trouble with mains pick-up, and it is often the video recorder that introduces the problem. In-line mains filters placed at the mains socket end can be a help, but if there is a serious problem, you may well have to use appropriate ferrite rings at the television or video recorder end of the mains lead to choke off the RF from the set.

DIRECT RF PICK-UP ON THE CHASSIS OR INTERNAL WIRING OF THE TELEVISION OR VIDEO RECORDER

If you have tried filtering the coaxial download and the mains lead to the video recorder and to the television set, and breakthrough is still noted on video and/or audio despite using all the appropriate filters, then the set itself is vulnerable to the actual RF field generated by the transmissions. Audio breakthrough can result from pick-up by long loudspeaker leads, and is particularly prone to occur if there is a connection from the set to an external loudspeaker or hi-fi system. Pick-up on external audio wiring can be minimised by the appropriate use of ferrite rings, but direct pick-up within the set is by far the most serious problem as a cause of television breakthrough. My own tests have shown that direct chassis pick-up is most likely to rear its ugly head if the RF is at VHF or UHF: high field strengths on the 144 MHz band created by SSB signals being the most troublesome. The degree of pick-up can often be dramatically reduced if the set is rotated slightly, but careful attention to antenna location and an increase in height of the transmitting antenna can often be a help. The social and political problems that can arise are beyond the scope of this article,

but I do recommend the greatest caution in dealing with any chassis pick-up problem, and it is extremely important to keep the "temperature" cool, and also to study the advice given by the RSGB. Do make sure that you really have tried all the appropriate filters in the download and mains lead. Don't forget to note down carefully the make and model of both the television set and video recorder for later reference, so as to avoid disturbing you neighbour when making further inquiries.

COAXIAL CABLE FILTERS

Highpass, bandpass, band-reject and various braid-breaking filters all come within this category. They are normally supplied with a coaxial Belling Lee type socket at one end for the download, and a plug on the other end for insertion into the television set. It is worth noting that they are normally designed for 75 ohm matching, and it should be remembered that the input impedance of the television set or video recorder is usually anything but 75 ohms! The set's input impedance will also vary greatly with frequency, being almost equivalent to a short-circuit at some frequencies, and extremely high impedance at others. For this reason, the degree of a filter's attenuation of an RF transmission outside Bands 4 and 5 may not be as much as is claimed, but even so it should be adequate to cope with the powers used by radio amateurs. There is no hard-and-fast rule about the positioning and order of filters when you have to use more than one, and a degree of trial and error is essential. You should already have found out which bands are causing the main trouble, and so some degree of appropriate filter choices should already have been made before you visit the problem installation.

It may not be sufficient just to filter the download at the point where it feeds into a video recorder, as the lead connecting the latter to the television set itself can also pick up RF from the field and transfer both forwards to the television set and backwards through the output circuits of the video recorder and into its more vulnerable circuits. One case of video breakthrough was completely cleared by adding an additional coaxial transformer braid-breaker hard on the output socket of the video recorder, having already added ferrite rings to the mains leads, and excellent filters to the coaxial input sockets.

If the set is receiving a comparatively weak signal on Bands 4 or 5, you should bear in mind that the use of too many filters in series may well attenuate the required television signals too much, and thus produce snow and poor colour instead of RF breakthrough patterning, etc. You may require both a braid-breaking action and highpass filtering, and while a combined filter may well be the easiest to install, you may achieve a lower loss if you use a straight-through highpass filter combined with a coaxial coil filter having additional ferrite rings or cores.

It is as well to consider problems that might be caused from bands on which you do not normally operate. It will save you a lot of aggravation, and your neighbour much frustration, if the filters that you have installed will also give a good attenuation on a band such as 432 MHz which you might very well be attracted to at some time in the near future.

If the problem is braid pick-up, then remember that the braid itself may re-radiate, near the television installation, a field picked up further up its length. You may well find that you can achieve improved results with the braid-breaker installed several metres away from the set. It is also well worth having a thick braid earth strap between the coaxial download braid and the nearest water pipe if this is conveniently placed. It may make matters worse, but there is a good chance that it may help.

MAINS BREAKTHROUGH FILTERING

There are many types of mains filters available either as adapters for use at the mains socket end, or within 13 amp plug tops. Assuming these are efficient, they will only filter the mains at a point two metres or so away from the set, and if you are in a difficult situation you may well have to use ferrite rings through which you wind the mains lead, as near to the set as possible. This will mean that you will have to take off the plug top, which hopefully is not a moulded type, but doing this takes some time, and it might be prudent to accomplish the filtering as quickly as possible. AKD have now introduced a new type of ferrite-core component in several parts, enabling you to wind the mains lead around the U-shaped pieces, followed by complete assembly and installation. These components are more expensive, but are much more easy to use and could well save the day.

CHECKING THE NEIGHBOUR'S ANTENNA

As often as not, the television signal being received by the set is a lot weaker than it need be. Many antennas turn out to be very old and partly rusty, water may have got into the download, and poor-quality splitters might have been used to feed more than one set. Don't forget the resistive splitters lose at least twice as much signal as do the transformer types. A transformer splitter may also give a degree of bandpass filtering action.

One of the worst evils to cope with is a television antenna masthead preamplifier. Some models are already quite well filtered, have a good noise figure, and have a good bandpass characteristic for just Bands 4 and 5. Some others, however, seem to amplify just about everything from DC to light, and can be upset with only the slightest provocation! You may well have to apply some efficient filters in front of the preamplifier, as well as at the bottom of the download. It is worthwhile examining the complete television installation at a neighbour's premises before you even start any filtering experiments. Frequently, a neighbour has no idea whether a masthead preamplifier is installed or not, as the installation may well have been inherited from a previous occupier. There may even be splitters feeding points that have long since disappeared, leaving an unterminated line on the unused port. If you can improve a neighbour's picture by some careful checking, you will be improving the atmosphere, but it is not advisable to touch the alignment of anything in the installation. By all means ask your neighbour to twiddle the knobs if you know that there is a problem such as frame hold or inadequate tuning.



The AKD HPFS Filter.

FILTER	28MHz	50MHz	70MHz	100MHz	144MHz	432MHz	480MHz	580MHz	750MHz
HPFS	-55	-60	-52	-44	-38	-4	-1.5	-2.3	-4
HPF 1	-55	-29	-31	-43	-24	-3.1	-2	-0.7	-2
PO five-section	< -65	< -65	< -65	< -65	< -65	-50	-4	-0.7	-1.1
special									
BB1	-3	-2.8	-2.6	-2.3	-2.2	-2.6	-2.5	-2.5	-4.1
TNF/22m	-0.5	-1.5	-3.5	-20	-25	-0.5	-0.5	-1.1	-1.8
HPF 2	-63	-39	-17	-2	-1.5	-0.8	-0.9	-1.4	-2.4
PO five-section	< -65	< -65	< -65	< -65	< -65	-46	-10	-1.2	-1
TNF/10m	-33	-9.7	-38	-15	-9.5	-1.5	-1.4	-0.5	-1.8
RF1/170cm	-20	-15	-12.5	-9	-6.5	-13.5	-3.4	-1.2	-1.4
PO/DTI F572A (barrel)	-5.4	-3.8	-3.1	-3	-2.7	-1.9	-2.4	-2.7	-2.9
PO/DTI F5 72A	-68	-82	-58	-58	-55	-20	-2.7	-0.9	-1.3

Table 2: Filter test measurements.

You might also check that the neighbour's antenna is actually pointing in the optimum direction, as I have known many antenna riggers who just copy the direction in which other antennas in the street are pointing! You can imagine what happens when a cowboy firm installs the first television antennas in the street!

AKD COAXIAL FEEDERS

Since the summer of 1986, several filters in the AKD range have been made available to RSGB members and non-members from RSGB Headquarters, and are regularly advertised in *Radio Communication*. I have taken some measurements of these filters on several bands, and have also checked the insertion loss on Bands 4 and 5 in a 75 ohm circuit. Please see the table for the insertion losses measured on the inner with reference to the outer. The braidbreaking action was not measured. I am also including various AKD and other filters which are either only available in the complete AKD kits, or have been available through the DTI, and, formerly, the Post Office Interference Service.

AKD HPFS (RSGB): This filter includes a transformer braidbreaker and has a steep highpass filter action below the 432 MHz band. It is suitable as an excellent filter for HF and VHF; but it is not likely to be of any help in rejecting 432 MHz. It has an acceptable insertion loss on Band 4, but the loss on Band 5 could be just a little high in fringe areas. It also gives an excellent braidbreaking action.

AKD HPF1: This highpass filter incorporates the simpler capacitance braidbreaking action, which is useful but not so effective as the HPFS type. The HPF1 is excellent at HF and may be adequate at VHF; but it is not suitable for 432 MHz. It has less insertion loss than the HPFS, but if you are primarily an HF operator it could well suffice. You may need to add a ferrite ring/coaxial coil braidbreaker of your own make to improve the braid rejection for HF. This model is supplied in the complete kits, and is also available direct from AKD.

AKD HPF2 (RSGB): An excellent filter for use with Band 2 FM radio installations, as it cuts HF extremely well, is good at 50 MHz, and gives some useful rejection at 70 MHz. By 88 MHz it only has

0.7 dB through loss, although this loss varies to a maximum of 2 dB on Band 2. It does not give any useful attenuation on 144 or 432 MHz. The through loss on Bands 4 and 5 is low.

AKD TNF/2/2M (RSGB): This filter can give a notch of up to 35 dB on the 144 MHz band, but my review sample was slightly maladjusted with the notch appearing at 140 MHz, thus giving just an adequate notch on the 144 MHz band. It is not suitable for use with Band 2 FM tuners, and will not give any attenuation at HF, nor at 432 MHz. It gives a very low insertion loss on Bands 4 and 5. There is an internal pre-set adjustment for tuning the precise notch frequency. A second sample notched correctly, and the overall, response from 45 to 245 MHz is shown in Figure 1.

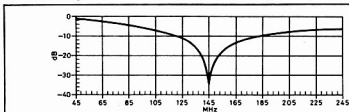


Figure 1: AKD TNF/2/2M Filter Insertion Loss Plot; 35 dB rejection at 145 MHz in a 75 ohm system.

AKD TNF/2/10M: This filter can be used if you just have a problem on 28 MHz, although for some odd reason the review sample also gave a good notch on 70 MHz. It is not suitable for use with Band 2 FM tuners, but does have a low insertion loss on Bands 4 and 5. Note that it does not give any significant attenuation on 144/432 MHz. Other models are available for 21 and 14 MHz bands, direct from the manufacturers.

AKD RB1/70 CM (RSGB): Specifically designed for rejecting strong 432 MHz band signals. It should give a rejection of around 20 dB on this band, but the notch position was placed too high in the band on the review sample, 21 dB notch being noted at 438 MHz, but only 13.5 dB at 432 MHz. It gives a low insertion loss at the top end of Band 4 and on Band 5, but there will be marked loss on Channels 21, 22 and 23, which may be relevant in a fringe area. The filter also gives some attenuation at HF and lower VHF. It is not suitable for Band 2 FM tuner feeds. You may need to adjust the small tuning preset inside for the particular part of the band that you are most likely to be using with high power, eg 432.300 MHz for SSB centre or 437 MHz for ATV centre.

AKD BBI (RSGB): This is a simple but very effective transformer type braidbreaker which just plugs in line with the television download. It is also useful for Band 2 FM tuner installations. The insertion loss is slightly higher than the original Post Office/DTI type FS7A, but the manufacturers claim that it has a better braidbreaking action at HF. Its use would not be advisable if channels at the top end of Band 5 are in a fringe area, in which case you might have to resort to a ferrite ring with the coaxial looped several times around it as

an inductive braidbreaker, which would have a barely perceptible loss on the inner. Ferrite ring inductive braidbreakers were once available from the Post Office/DTI under the type numbers FS62/1A and 62/2A, the two types having different numbers of turns around the ring.

The former Post Office/DTI type FS74A transformer braidbreaker was originally supplied as a small cylindrical in-line model having a plug on one end and a socket on the other, without any flying lead, allowing it to be put right on the output of a video recorder. More recently it was modified to have a flying lead on the output with a plug, and the performance was not quite so good.

PO/DTI FS72A: This filter was nominally designed as a highpass on the inner only, and was intended to remove the entire HF and VHF spectrum. It had quite a low loss on Bands 4 and 5, and while some samples did give some rejection at 432 MHz, other did not; the design changing over the year. Although a very useful filter, one almost invariably had to use some form of braidbreaker with it.

PO 5 & 6 SECTION HIGHPASS FILTERS: The original Post Office Interference Service used to supply five-section filters which had a superb performance at HF, VHF and even at 432 MHz. There was no braidbreaking action, and while the insertion loss in Channels 21, 22, 23 was rather high, losses on higher channels were low. A few six-section filters were specially made, and I am lucky enough to have one of these. They were handmade, and offered a fabulous rejection at all frequencies up to the top end of the 432 MHz band,

and yet the insertion loss on Bands 4 and 5 was low. It is to be hoped that a new version of the six-section filter might become available shortly.

CONCLUSIONS

Probably the most important filter to consider for HF and lower VHF is the HPFS, but you may have to consider the HPF1, or an old FS72A with an inductive braidbreaker if you are in a fringe reception area. The notch filters can be useful, but you will have to make sure they are on frequency. Although expensive, the new ferrite inductor kits from AKD are very useful for inserting inductance on audio and mains leads, and these can also be recommended for use with telephones and other appliances which have a poor electromagnetic compatibility. Do not forget that when you are carrying out tests with a neighbour, you should always choose the most favourable antenna direction, which may not necessarily be one which is beaming at the television antenna. Taking trouble over removing a neighbour's TVI problem becomes a useful investment in the furtherance of your hobby.

(TO BE CONTINUED)

ABOUT THE AUTHOR

Angus McKenzie became a licensed amateur in 1960 and was soon active on 144 MHz and HF. Currently, he is active on all bands (when time allows) on SSB and CW, VHF/UHF bands, and on FM. He first transmitted stereo multiplex on 144 MHz in 1970, then stereo PCM, 16-bit digital in 1983, including colour television. He has the Supreme VHF/UHF awards (including Senior) on 70, 144, 432 and 1296 MHz.

He entered the sound recording and audio industry in 1955, and became an audio consultant in the late



60s. He spent some time in gramophone record and hi-fi retailing, and his time now is spent in "audio criticism" including writing reviews and articles. He is a consultant to legal and consumer organisations on audio engineering and RF matters, and is currently a member of the RSGB Council and of the VHF Committee.



The FS74A transformer braidbreaker.



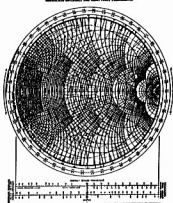
Ferrite ring FS64/2/A coaxial braidbreaker.



The PBT600S telephone with new AKD DIY ferrite ring filters.



450 MHz bypass six-section filter.



SMITH CHART FORMS

Anyone who has been involved in radio frequency or transmission line design will be aware of the Smith Chart conceived by Philip Smith of the Bell Laboratories in the 1930s and the many uses to which it can be put.

REMEMBER

When inquiring about products published in AR, always mention where you read of the product!

One inherent short-coming of the original design was that it only allowed the manipulation of either impedance or admittance values without the necessity to rotate values through 180 degrees to convert from impedance to admittance or vice versa. There is a way to overcome this short-coming however, and for your convenience Stewart Electronics are now stocking a dual co-ordinate Smith Chart form.

The form, printed on high quality bond paper has the impedance co-ordinates in their normal red and the admittance co-ordinates in a pale green. Ideally suited to any application involving matching networks, this form should save much time and many potential inaccuracies through the continual process of rotating values through 180 degrees.

The dual co-ordinate Smith Chart form is available from stock in single sheets (Stock No BX900) or in packs of 100 (Stock No BX900C).

For further information contact Stewart Electronic Components Pty Ltd, 44 Stafford Street, Huntingdale, Vic. 3166, phone (03) 543 3733.

VICOM ACQUIRES SCALAR

Melbourne-based telecommunications company, Vicom International Pty Ltd, has acquired the assets of the Scalar Group of companies.

The Scalar Group ran into financial difficulties last year culminating in the liquidation of the company.

A new company has been formed — Vicom Scalar Pty Ltd — to take over the manufacturing, exporting and marketing activities of Scalar.

Michael Goode VK3BDL, has been appointed General Manager of Vicom Scalar and new R and D programs established to ensure that the operation continues to expand its market position.

Vicom Scalar will be entering new high technology markets during 1988 and will substantially increase export revenue.

"The company is ideally placed to be a major supplier of defence, government and major communication users within Australia and South East Asia and we intend to give the other companies

operating in this area a run for their money", Michael said.

Vicom's other activities include communications engineering, consulting, research and development, test equipment and specialist product sales.

Vicom is well-known to radio amateurs since it was originally formed in 1974 to supply loom and other brands to the amateur market.

The founding directors held various positions on the WIA Victorian Divisional Council before Vicom was formed. Since this time the group has gone from strength to strength with offices opened around Australia and overseas.

NEW DATES GIVE PERTH ELECTRONICS SHOW MAXIMUM IMPACT

The 10th annual Perth Electronics Show will be held at Claremont Showgrounds from July 13 to 17, (two weeks earlier than normal), to ensure the innovation planned for the exhibition's anniversary achieves maximum impact with industry, media and consumers.

Organisers have been endeavouring to work around the Retravision Conference in Queensland.

The new July dates guarantees a large attendance by consumers because the Perth Electronics Show is clear of any other competing attraction in the State. Nationally, the electronics industry will also be focussed on Perth because the exhibition does not clash with any other industry event throughout Australia.

Fresh ideas on content and promotions mean the committee expects large crowds to support the show, which has become the most successful consumer electronics and homeware exhibition in the Southern Hemisphere. The trade aspect, which has become such an integral part of the show, is to be further enhanced with the establishment of eastern States-based industry representation. The major role of these committees will be to attract influential buyers, industry VIPs and national trade media to the show. A whole host of promotions are also being arranged to make certain the public attends the show.

Club Corner

WIA NORTH WESTERN BRANCH

The postal address for the North Western Branch is:

WIA, Tasmanian Division, North Western Branch, PO Box 194, Penguin, Tas. 7316.
Club call sign in VK7HNW.

Meetings are held on the second Tuesday of each month at the Penguin High School, beginning at 7.30 pm. Business sessions are brief and are followed by an activity or topic of interest and supper.

Activity and club station nights, when held, are on Fridays at PHS, at 8 pm. Details from Greg VK7ZBT.

Interests within the Branch include HF Operation, ATV, Special Communications, Antennas and Computing. Several members of the Branch are now becoming very interested in packet radio.

For further information contact Greg Stammers VK7ZBT, President, or Tony Clayton VK7AH, Secretary, phone (004) 24 5375.

Visitors are welcome at meetings and activity nights.

—Contributed by Tony Clayton VK7AH, Honorary Secretary, North Western Branch

GEELONG AMATEUR RADIO CLUB

The 40th Anniversary of the club will be celebrated on June 18, 1988. This will be a great "Natter Night" complete with a guest speaker. To help obtain an estimate of numbers attending please contact the Secretary, GARC, PO Box 520, Geelong, Vic. 3220 as soon as possible if you are interested in attending.

During this anniversary year the club is seeking photographs, slides or movies of the activities of GARC of the years. Readers who may be able to assist are requested to contact Alf Forster VK3AJF, on Geelong 21 4190.

Work is progressing well at the Mount Anakie site of repeater VK3RGL (Channel 8).

In December 1987, a number of club members participated as checkpoint operators and net controllers, on HF and VHF, for the Caltech Bike Ride from Stawell to Melbourne. Approximately 3700 cyclists took part in the event and WICEN undertook to provide communications — providing about 20 operators each day.

EASTERN ZONE 50TH ANNIVERSARY

The Eastern Zone is celebrating its 50th anniversary on the weekend of May 13-15, 1988. (The inaugural meeting was held at the Railway Hotel in Warragul on May 14, 1938). The location for this coming event will be the scenic Moondarra Camp, a short drive north of Moe. It is close to the towns of Erica and Walhalla, the new Thompson Dam and the Baw Baw National Park.

Accommodation and meals will be provided for up to 100 people at a very reasonable price. (See Registration Form inserted in this issue of AR for price details).

Activities planned for the weekend include QSL and CW contests, fox hunts, white elephant sale/auction, childrens competitions with prizes, homebrew contests, performance checks on amateur equipment and trade displays. Of course, this is all in addition to sitting around a fire remembering those good-old times and taking it easy!

All amateurs and their families are welcome to register for what will be a fun filled occasion. Do not delay with your registration as numbers are

limited. For more information please contact Stewart VK3BSM on (051) 27 4229, Bill VK3KBM (051) 277616 or Chris VK3KME (051) 27 5656, or write to PO Box 459, Moe, Vic. 3825.

—Contributed by Chris Morley VK3KME, President, Eastern Zone WIA

SUMMERLAND AMATEUR RADIO CLUB

The President for the past three years, "Doc" VK2DOC, has resigned. The club and committee accepted the resignation with great regret. During Doc's presidency the club has gone from strength to strength, with both membership and finances doubling. The 80 metre net and the Le Balise Award were instituted early in the period and have proved to be very popular. With Doc as the main MC, the club, via the net, has made friends with many amateurs and listeners from as far afield as Western Australia and New Zealand.

Through the courtesy of John VK2JWA, the clubrooms at Richmond Hill are indeed fact! Two digipeaters are operational and the Byron Bay repeaters will shortly be operating.

If any amateurs or SWLs are about to visit the area contact can be made via PO Box 524, Lismore, NSW. 2480. A warm welcome is guaranteed.

The digipeater, VK2RPL, is currently operational on 145.050 MHz, at Mount Nardi, north of Lismore. Australian map grid co-ordinates are Zone 56, Easting 582820, Northing 6842460.

This frequency has provided Summerland with a 24-hour path via VK4 via VK4RBT-3. Contacts are possible into Brisbane and beyond.

It is anticipated that the second part will be operational again on 147.575 MHz by this time. Coffs Harbour should also have their repeater installed by this time and it will be interesting to investigate the Nardi-Coffs path!

Whilst it is possible to use VK2RPL as a switch (ie ask the digi to connect you to another station via the digi), C and CA commands it is requested that all stations refrain from using this method of operation; also accessing PBBSs using this method will cause the BBS not to recognise your connect request correctly. Use of VK2RPL solely as a digipeater on either frequency as required will save us all hassles.

—Contributed by Jim Cunningham VK2ESI, Public Officer, SARIC

TOWNSVILLE AMATEUR RADIO CLUB

The Townsville Amateur Radio Club had another successful year in 1987, due to the excellent support of members.

The club's newest acquisition is a two metre repeater on Mount Inkerman. At Mount Stuart there are beacons for two metres and 70 centimetres, repeaters for two metres and amateur television, whilst on Mount Saint John there are beacons for 10 and six metres. The club also has a portable WICEN repeater. This constitutes a considerable amount of work by members in their construction and maintenance.

The shack is quite adequate with HF, VHF, RTTY and ATV equipment.

Meetings have been enriched frequently with well-presented lectures, and social outings have become family occasions. Substantial displays were held at the showgrounds and Lavarack Barracks creating a great deal of interest and the club has been involved with WICEN exercises and JOTA.

It was an honour to have the President of the WIA, David VK3ADW, attend the Club Convention. The club benefited from his short stay and, likewise the WIA must have gained much in feedback from this visit.

In the near future, the club may become incorporated. A sub-committee is working on the viability of this issue.

—Contributed by Evelyn Bahr VK4EQ, President, TARC

DEADLINE FOR JUNE IS April 18, 1988

Magazine Review



Roy Hartkopf VK3AOH

34 Toolangi Road, Alphington, Vic. 3087

- Q — General
- C — Constructional
- P — Practical without detailed constructional information
- T — Theoretical
- M — Of particular interest to the Novice
- X — Computer program

AMSAT UK OSCAR NEWS — No 69, February 1988. General satellite news. Satellites for the beginner. Letters, circuits, computer programs, etc.

SHORT WAVE MAGAZINE — December 1987. Index to Volume 45 (G). Seical for aircraft (G). Radio Data System (G).

CQ MAGAZINE — January 1988. The Tchnad Story (G). 160 metre receiving antennas (G). World-wide WPX Contest (G). Nuclear accelerator (G).

RADIO COMMUNICATION — January 1988. 75th Anniversary issue (G). 1987 Convention (G).

WORLDWIDE — January 1988. APRIL Forum (G). Amateurs aid hospitals (G). DX news, QRP, information on contests, etc (G).

ELECTRONICS NEWS — January 1988. Trade information on new products. New digital storage oscilloscopes with electro-luminescent screen. Ten gigabit discs, etc.

QST — December 1987. VHF Watt meter (C). Amateur radio and the Blind (G). RX Noise Bridge (C). DX Century club awards (G).

73 MAGAZINE — December 1987. Hand-held special issue (G). Speech for the Vic-20 and Commodore (C).

STOLEN EQUIPMENT

A Yaesu FT-480R, two metre all-mode transceiver was stolen from the front of the Geelong Amateur Radio Club Rooms on February 5, 1988. The serial number is 2F 180653.

Readers with any knowledge of this unit should contact Barry VK3YXK on phone 43 7317 or the Geelong CIB.



1000TH ANNIVERSARY

Dublin, Ireland, is celebrating its 1000th anniversary in 1988. The Dublin Millennium Amateur Radio Committee (DMARC), is committed to partaking in this unique celebration through the medium of international amateur radio. A number of events have been planned for 1988.

A special station was operational on Saint Patrick's Day, March 17, from the centre of Dublin, Ireland, when as many other Dublins world-wide were contacted on radio.

—Contributed by Martin Hughes EIBFV



VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW. 2150

ANNUAL GENERAL MEETING

Members are reminded that the 1987/88 AGM will be held on Saturday, April 30, at 2 pm, at Amateur Radio House, 109 Wigram Street, Parramatta. A separate posting will be made with the annual reports and matters for the meeting.

CONFERENCE OF CLUBS

This will be hosted by Fishers Ghost ARC on Saturday (and Sunday if required) April 16. Matters for discussion will include agenda items submitted by clubs and the agenda items for the 1988 Federal Convention. Meeting location: Cambeltown region.

TRASH AND TREASURE

The next events will be held as usual in the Parramatta car park at 2 pm on Sundays May 29 and July 31.

POSTCODE CONTESTS

The last Friday evening of the month between 9 and 11 pm. April 29, 70 centimetres all modes; May 27, two metres SSB; June 24, two metres FM simple. Details on AX2WI broadcasts.

FIELD DAYS

Easter — the 40th Urunga Convention on the mid-North Coast will be held.
June long weekend — the Oxley Region ARC at Port Macquarie.

STATE REPEATER COMMITTEE

Barry White VK2AAB, has taken over the duty of co-ordinator. Dennis Williams VK2XDW, is liaison to Council.

VI8NSW

By now most clubs will have a one week slot. Check with your local club or group for their operating schedule. Those amateurs who will not have the chance to work with VI8NSW through one of the clubs, may have a three-hour segment in a week reserved every two months. The next such slot will be May 30 to June 5. Details and registrations from the Divisional Office, from 11 am to 2 pm. Times start at 1000, 1300, 1600, 1900, 2200, 0100, 0400 and 0700 daily. When inquiring, advise first and second day and time slot preference and expected operating bands and modes. Other slots will be in early July, August, October and December. In November there will be

evening slots. During the day in November there will be the Parramatta Bicentenary Award which requires you to work VI8NSW at 10 different historic sites.

Club and group weeks (as at February 18), are April 4 to 10 Hornsby and District ARC; 11 to 17 Blue Mountains ARC; May 2 to 8 Orana ARC; 9 to 15 Castle Hill ARC; June 6 to 12 ANARIS; 20 to 26 Schoole — Orange; High; July 18 to 24 Illawarra ARS; September 5 to 11 Fishers Ghost ARC; September 26 to October 2 RNARS; October 24 to 30 Westlakes ARC. During the week September 19 to 25 there will be celebrations of the working by Marconi and Fisk between England and Australia 70 years ago.

There is a VI8NSW QSL card which is sent for all cards received direct (with return postage) or through the bureau. The AX2WI Broadcasts will keep you up to date on the use of the special call sign. With about 5000 amateurs in the VK2 call area it has to be shared as widely as possible.

BLANK QSL CARDS

The Division has a new range of cards available which are suitable for overprinting your own call sign. It features the Bicentenary logo. Check the office for details and cost.

USING THE BICENTENARY LOGO

The use of the logo and other names associated with this year of celebration is copyright to the Bicentenary Authority. The VK2 Division has been appointed by the Authority to act as their agent for those who wish to design and produce their own card or award using any Bicentenary references. The approval condition is that the amateur must be a member of the Institute or the club affiliated with the Institute. This approval applies throughout Australia. Further details may be obtained from the VK2 office on phone (02) 689 2417 from 11 am to 2 pm weekdays or by writing to the address above.

ITU DAY

This is on May 17. On that day VI2ITU will be activated. A special QSL card will be exchanged.

AWARDS

The VK2 Division introduced a range of awards from the start of this year. Full printed sheets are now available and may be obtained from the office. If you want the sheets posted, please include three

37 cent stamps to cover the paper and postage costs. It is also available from the VK2AWI Packet Bulletin Board on 4850 in the Sydney-area or on some of the 7575 systems. The awards are: The Bicentenary of Australia Award, 1788-1988, which requires 200 contacts with VK2 amateurs between January 1 1988 to December 31 1988, The Worked All New South Wales Award, The NSW National Parks Award, The 25's Award.

In September there will be a Marconi Award and in November the Parramatta Bicentenary Award. Further details will also appear in the magazine awards column.

TECHNICAL TAPE

A reminder that the AX2WI Broadcasts this year begin at 1045 and 1915 with a pre-recorded tape. The news content follows at 1100 and 1930 on Sunday. The tape is available for use by other Divisions. The tape content covers a range of historic and technical subjects. The Divisional Broadcasts originate from AX2WI Dural on HF and VHF frequencies. It is further relayed through several country repeaters.

NEW MEMBERS

The Institute would like to welcome the following who were in the February intake.

L Adney VK2ZLA	Beacon Hill
R R Fox VK2FKP	Chatswood
P K Freeman VK2MCZ	Cassilis
M G Howard VK2XIL	Chatswood
C A Jensen Assoc	Artarmon
Y Timmer Assoc	Bowraville
R J Van Heekeren VK2MDK	Newtown
W J Watts VK2MDQ	Nambucca Heads
R B Wilson Assoc	St Marys

EXAMINATION DEVOLUTION

There was a meeting held at Amateur Radio House on Tuesday, February 16, to hear Alan Jordan from DOTC outline the transfer of the examinations. Attendance was 35. The same meeting was held in all other States. The new requirements have been reported in *Amateur Radio* and other publications. Those examiners who have not received copies of the information should write direct to DOTC in Canberra or check with your Divisional Council for details.

MORSEWORD © 14

Compiled by Audrey Ryan

30 Stirling Street, Montmorency, Vic. 3094

ACROSS

- 1 A fixed gaze
- 2 Capital of Peru
- 3 Matted fabric
- 4 Chanted
- 5 A preposition
- 6 On the top
- 7 Interior
- 8 Leave
- 9 Donate
- 10 Listen

DOWN

- 1 Joint
- 2 To lie partly over
- 3 God of love
- 4 Curve
- 5 Drunkards
- 6 Acts
- 7 Float through the
- 8 God of war
- 9 Oath
- 10 Spouse

Solution see page 60. . .

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Five-Eighth Wave



Jennifer Warrington VK5ANW
59 Albert Street, Clarence Gardens, SA, 5039

April is one of the busiest months in this Division. The Clubs' Convention will be held over the weekend of the eighth to tenth. I hope that all clubs will send delegates if they possibly can. The clubs that have attended in previous years have found that there is much to be gained by discussing things "face-to-face" and we feel that Divisional Council also benefits by knowing what you think. One of our aims this year will be to look at ways to make the benefits of membership more tangible. In other words, to differentiate more between what members can get and non-members cannot! I will not be too specific at this stage as there are several things being "tossed around", but be assured that we are aware that many members are not happy with the status quo. The main aim being to keep current members happy and to encourage new members to join.

Of course, the other way to ensure that you have a say in the running of the Division is to nominate for Council. If you didn't do that this year when you received the Nomination Form and still feel that you could be of service, please let a member of Council know, we are able to co-opt members if the situation warrants it. If you live too far away to attend meetings in Adelaide, do not forget to elect the members that you want. (I hope that there will be enough volunteers to have an election).

I wish to thank Ray Bennett VK5RM, who, when it looked as though we were not going to get a replacement for the Historian, offered to continue for another 12 months, and also John Hampel VK5SJ, who has offered to take over from Ray, but was not able to do so until about the middle of the year. I have left it to John and Ray between them to sort out how and when this will happen.

As you will be aware, our speaker in February

was not Ray Dobson VK5DI, but the representatives of DOTO, Canberra, speaking on the proposed Development of Examinations. We hope that some useful discussions and information will be had. Our thanks to Ray who agreed to postpone his talk on the "Thick Film Hybrids as used in the Philips FM900 series two-way radios". Ray tells me that these hybrids can be used individually such as a VHF/UHF preamplifier, or combined to make a UHF to VHF or UHF to HF converter (down to 21 MHz). The parts include a UHF amplifier, UHF mixer, UHF VCO and IF amplifier. Ray has several suggestions as to how these bits and pieces can be used (some are only the size of a postage stamp), but he would also be pleased to hear other suggestions from members.

All being well, Ray will now do his talk on Tuesday, May 24, at 7.45 pm.

It is with regret that we mourn the passing of three well-known amateurs. Jim Poulton VK5UT, passed away the week before Christmas, very suddenly. Carl Sappatzer VK5SS, passed away in January after a short illness, and I have just heard that John O'Dea VK5KOP, from Middleton, near Victor Harbor, passed away suddenly. I hope that amateurs who know these men better than I will write something for the Silent Key column. We extend our sympathies to the families of all these amateurs.

All good things come to an end, or so they say, and sometimes we need to make the decision to end them. I have enjoyed writing this column but have decided that, perhaps it is time to let someone else take over. I began in July 1982, when a Federal Convention Agenda item decided that each Division should have a column of its own. I thought that it was a great idea and said that

I would do that first one (the idea in my mind being that we would have several people taking it in turn, needless to say that did not happen and, apart from one or two occasions, I have been doing it ever since). I have no wish to better Eric Jamieson's record (VK5LP). I think he does a fantastic job and certainly deserved the Ron Wilkinson Achievement Award. I doubt there ever was a more worthy recipient, not only for the column but for the help and encouragement he gives to others, particularly the young. Perhaps the events of the past week have also had some bearing on my decision. For those who don't know, my OM Mike VK5AMW, suffered a heart attack, but I am delighted to say that, at the time of writing, is making a good recovery and is expected home in a few days. My thanks to all who sent their good wishes. It was appreciated very much.

So, if there is a budding columnist out there (or several) please let us know. After all, if I can do it...

DIARY DATES

CLUBS CONVENTION WEEKEND — April 8, 9, 10.

YWCA Cooranga Campsite, Aldinga Beach.

(Visitors welcome, but please let Don VK5ADD, know if you are coming, for catering and/or seating arrangements).

Tuesday, April 26, AGM — 7.45 pm. BGB (34 West Thebarton Road).

Tuesday, May 24, Ray Dobson VK5DI, on "Thick Film Hybrids" 7.45 pm.

Tuesday, May 31, Buy and Sell Night, 7.30 pm (no ESC etc).

VK3 WIA Notes



WIA VICTORIAN DIVISION

412 Brunswick Street, Fitzroy, Vic. 3065

NEW MEMBERS

The following applications were received for the month of December 1987, and were accepted by Council on January 20, 1988. A warm welcome is extended to all.

Gregory Oke VK3BRU
David Dessardo VK3TBC
David Merrett VK3PKZ
Emmanuel Miranda
Frank Patrick VK3RJP
Matthew Robinson VK3TAY
Douglas Wilson
Peter Ramsden VK3TPR
Graham Reynolds

Ouyen
Airport West
Casterton
Diggers Rest
Bundoora
Canterbury
East Malvern
Mill Park
Doncaster

THANKS

The WIA (Victorian Division) would like to express its thanks to the following for their donation of QSL cards towards the WIA collection.

Perce VK3MX
Geoff VK3AC
Mrs Mary Morris for cards of her late husband, Morrie VK3BJ.
Mrs Lisa Morgan for cards of her late husband, Ivor VK3DH.
Mona Swinton VK3BRE, for cards of her late husband, Alex VK2AAK.
Marjorie Williamson VK3HQ, for cards of her late husband, Alan Hutchings VK3HZ.
Bing VK2BCH, for cards of Silent Key, Doug VK2OUG.
Mrs Pat Paine for cards of her late husband, Doug VK3FH.

We would also like to thank Alan VK1WX, and John VK1CJ, for unclaimed QSL cards from the VK1 bureau.

The collection is still in need of rare DX, commemorative QSLs, special prefixes and pre-war QSLs. Please contact Ken VK3TL, phone (059) 64 3721, or write to PO Box 1, Seville, Vic. 3139, for QSL pick-up.

CALLING ALL CLUB SECRETARIES AND QSL MANAGERS

As you no doubt already know, the WIA has established its own QSL collection. There have been some very generous donations of all kinds of QSLs from many DXers throughout Australia, but there are many gaps in the collection. This is a never-ending process as new call signs and prefixes come on the air. The WIA would be grateful indeed, if your club committee would consider donating all unwanted and uncollected QSLs to our collection. Some clubs have already done this and we would like to see the policy extended.

QSLs from metropolitan Melbourne will be collected personally, but country and interstate donations may be collected through the kind co-operation of WIA members who are passing through your area on their way to Melbourne. Please direct inquiries to the Honorary Curator, Ken VK3TL, PO Box 1, Seville, Vic. 3139, or telephone (059) 64 3721.

 A Call to all Holders of a

NOVICE LICENCE

Now you have joined the ranks of amateur radio, why not extend your activities?

THE WIRELESS INSTITUTE OF AUSTRALIA (N.S.W. DIVISION)
conducts a Bridging Correspondence Course for the AOCF and LAOCF Examinations
Throughout the Course, your papers are checked and commented upon to lead you to a SUCCESSFUL CONCLUSION.

For further details write to:

THE COURSE SUPERVISOR
W.I.A.

PO BOX 1066
PARRAMATTA, NSW, 2150
(109 Wigram Street, Parramatta)
Phone: (02) 689 2417

11 am to 2 pm M to F and 7 to 9 pm Wed

Q R M from VK7

John Rogers VK7JK
VK7 BROADCAST OFFICER

1 Darville Court, Blackman's Bay, Hobart, Tas. 7052

This is the first opportunity to bring news of the changes in Branch Officials which has been brought about by the various Annual General Meetings!

NORTH WESTERN BRANCH

President — Greg VK7ZBT
Vice-Presidents — John VK7ZPT and Noel VK7EG
Secretary — Tony VK7AH
Treasurer — Bruce VK7MB
Repeater and Beacons Co-ordinator — Andrew VK7ZAP
Assistant Repeater and Beacons Co-ordinator — Andrew VK7ZHA
QSL Organiser — Steve VK7EQ
Stores — Rob VK7KAB
Publications — Terry VK7BV
WICEN Director — John Duncombe VK7ZPT
News Scribe — John VK7KDR
Branch Publicity Officer — Ron VK7RN

Volunteers from the NW Branch are looking forward to a great day helping with the exercise at Wynyard this month. The ANZAC weekend always seems to be a time for enjoyable activities and this year should be no exception.

In the south, the new officers are:

President — Stuart VK7NKA
Vice-President — Russ VK7ZRP
Secretary — Rai VK7VV
Assistant-Secretary — Mike VK7MC
Treasurer — David VK7NDO
Assistant-Treasurer — Peter VK7GT
Equipment Officer — Mike VK7MC
Southern Broadcast Co-ordinator — Mike VK7ZMH
WICEN Co-ordinator — Alan VK7CI
Repeater Co-ordinator — Antony VK7ZTA
Membership Officer — Vic VK7VK

QSL Officer — Peter VK7GT

Publicity Officer — Lew VK7LJ
Honorary Auditor — Brian VK7BS
Activity Centre — Russ VK7ZRP
State Council Delegates — Peter VK7ZPK and Mike VK7ZVW

There is an important change of address: The Southern Branch, PO Box 123, Sandy Bay, which replaces the 105 Newtown Road, Hobart address for all official correspondence.

The WICEN (South) group has established a close working relationship with the State Emergency Services, and so has formalised their call-out procedure to enable quicker deployment of their resources in the event of an emergency. There are four sections — Base, Satellites, VHF Mobiles and VHF Special Services. Details of how contacts are made "down the line" have been circulated to registered members, but are also available to others who may be interested in becoming part of the network. Contact Alan VK7CI, QTHR.

WIA meetings for the month will be held as follows:

North Branch — at the Maritime College, Launceston on April 8 at 7.30 pm.

North Western Branch — at Penguin High School on April 12 at 8 pm.

Southern Branch — at the Activity Centre, 105 Newtown Road, Hobart on April 8 at 8.15 pm.

For VK7s who travel to the mainland for their holidays for the winter, a reminder that the VK7VI Sunday Morning Broadcast relay on 20 metres will be recommencing soon. Please watch for detailed announcements during the month.

For the first time in many-a-year there is a news-co-ordinator for the VK7VI broadcast in the north (Bill VK7AV, who is happy to make tapes of his contribution), in the north-west (John VK7KDR, temporarily anyway!), and in the south (Mike

VK7ZMH, who has acquired a rig for HF so that he can collect news on the Saturday morning net). Now, there should be very close to a commercial/professional level of news-gathering in VK7 from now on.

Work is progressing at the Hobart Activity Centre on a vintage AM transmitter, originally a commercial station, 7CA, and, if Barry VK7RS has anything to do with it, it should be heard on the air by the time the 1988 TARC comes around. Rumour has it that it will be used to skyrocket the interest in top band!

As this column was being prepared, both the north and south of the island were making a common approach to improving their two metre repeaters. Both branches were in the process of acquiring new control units and, by the time this is published, all should be reaping the benefit. There is no doubt about it — the VHF repeater groups may not be large in number but they are great in their efforts!

Two small appeals to end this month's QRM — the first is for actual, real, practical support for the much-talked-about idea of having two or three minute tapes from members for insertion in the weekly broadcast, much the same as the Federal Tape. The subject can be of your own choice, preferably directly concerned with amateur radio topics — but remember that the editor would retain the right to edit!

The second appeal is for members to come forward with an offer of a short talk, again on some point of interest to operators, to be given at branch meetings throughout the year. Last year this did happen a few times, always with good results. This year could we make it a regular feature of monthly meetings?

73, John VK7JK



Forward Bias

Ken Ray VK1KEN

Box 710, Wodden, ACT, 2606

Amateur operators in the National Capital are actively supporting the Australian Bicentenary. A Bicentenary Committee has been established with Dan VK1ST, Philip VK1PJ and Rob VK1KRM as members. VIB8ACT has been very active on the HF bands during the first few months of 1988. We are now preparing for a major portable operation at the opening of the new Parliament House.

Approval has been given for VIB8ACT to operate from the Parliament House site on the opening day, May 9, 1988. Operation is planned for all HF bands with preferred frequencies being 3.588, 7.088 (or 7.188), 14.188, 21.288 and 28.488 MHz.

It is hoped to broadcast the Queen's Message live using a VHF link from Parliament House to HF relay stations elsewhere in the ACT.

Contact with VIB8ACT will gain you an attractive Bicentenary QSL Card and also earn valuable points toward the Australian Bicentenary National Capital Certificate. The QSL and Certificate will have matching artwork so you could receive the "matched set" by joining in the Bicentenary Celebration on the air.

Rules for the certificate are explained below and it is hoped amateurs around Australia and the world will want to achieve this award.

More details about the Parliament House Opening Day operation will appear in May AR and also via both the VK1 weekly broadcast and the Federal Broadcast.

RULES

QSL card confirmation of contacts claimed is not required.

Any VIB8 special event call sign may only be claimed once per band per mode. Eg: Contact with VIB8ACT on 20 metres SSB and 20 metres CW can be claimed as two contacts, or 10 points, because it is different modes on the same band.

Any band and mode within the terms of the applicant's licence, is accepted.

Requests for endorsements will be considered. Eg: If all points claimed are for contacts on a single band or mode, an endorsement to the Certificate would be possible.

Contacts made by any terrestrial voice repeater method are not valid. Packet radio contacts using a digipeater (or several digipeaters) are valid contacts.

FOR HF OPERATION

Contact with any Australian call sign counts as one point, and

Contact with any Australian VIB8 special event call sign counts as five points.

For VK operators only — All contacts, except for VIB8 special event stations, are to be made with call areas other than the area from which the applicant is operating.

FOR VHF OPERATION

Contacts between stations up to 30 kilometres

equals one point, and over 30 kilometres equals four points.

Contact with any Australian VIB8 special event call sign counts as 10 points, ie VIB8ACT or any other "VIB8..." prefix.

COST

The cost of the certificate will be \$44 or seven International Reply Coupons (IRCs). Please include with application.

APPLICATION

Applications for the certificate should include the applicant's name and call sign (as they want it to appear on the certificate) and their return address.

Applications for the certificate should be in the form of a log extract showing for each contact claimed the call sign, the date and time (UTC) of the contact, mode and band used and the signal reports exchanged. All claims must be certified as a true and correct record of the log by at least one other licensed amateur other than the applicant. This requirement may be waived for applicants in remote areas — please attach an explanation.

Inquiries for further information should be directed to Philip Rayner VK1PJ, on (062) 92 3260 (home) or at the address below. Applications for the certificate should be sent to:

VIB8ACT Awards Manager, GPO Box 600, Canberra, ACT, 2601.

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

Over to You!



Some years ago I visited the radio museum in Alice Springs and, as they had no information of the operation of VKZ, a photocopy of this card was sent to them. I was the operator at VK2FZ and the recipient of the card.

Joe VKZ, later took out a VK5 call sign and moved to Adelaide.

The rig in the photograph made the first ever contact with Brunel. There was a DXpedition by WOELA to Brunel and I was VK4QL, in Townsville.

WOELA was a friend and I knew of his plans so was just waiting for him to get on the air. My first contact with VSSELA was on July 27, 1952, on 14 MHz. WOELA is still active today!

My rig was an 807 preamplifier operating 50 watts from 3.5 to 28 MHz. The antenna was a 135 feet Windom, still in use today. The receiver was an AR7 with band spread coils.

Incidentally, it was whilst I was based in Townsville with the RAAF that I started the DX page in AR.

It is nice to see the IPS Radio and Space Services monthly summary appearing in AR.

Yours faithfully and 73

Frank Hine VK2QL
30 Abbotsford Road
Homebush, NSW. 2140

BF



WHERE IT ALL HAPPENS!

The accompanying photograph shows the radio shack at VK7OW. Since the photograph was taken a shelf has been put over the Collins equipment on the left and that is now packed with equipment.

There are 18 transceivers in total, also a rare First World War "Sterling" Spark transmitter used by the RAF in the UK.

Note the superb 1927 Philips carbon microphone in the original sprung cradle used by an early New Zealand broadcast station.

The station sits on top of an extensive metal ground mat.

73
Jim Davis VK7OW
Latrebe, Tas. 7307.

BF

THE TRAVELLERS' NET

I cannot keep my mouth shut any longer, and wish to write in defence of the Travellers' Net.

Firstly, Arthur VK6ART, does not want to be a knight in any kind of armour, although, I think he deserves to be for his services to amateur radio.

Secondly, I do not think he has any cronies, and his role was not self-appointed.

Third, the job he does year after year, every day, could not and would not be attempted by 99 percent of amateurs. It would be found his service is supported by a very large number of operators, plus listeners and emergency services.

It is not his net exclusively, he is assisted every day and it is used daily by hundreds of different amateurs during the year (up to 30 or even more per day).

Is it possible to program these electronic robots to switch off on one frequency (14.106 MHz) only for one hour between 0230 and 0330 UTC daily and continue on for the other 23 hours uninterrupted by those travelling amateurs? The net only lasts for one hour of the 23!

What is being said in effect is:

"Look Arthur, our machines want this particular frequency 24 hours per day. This is important — we cannot spare this one hour, so we demand the net users move somewhere else". Get off or else! My guess is, if the net users did this, the robot owners would follow it up and repeat their demands.

Arthur VK6ART, being any other than the man he is, might well say, "What is the use of arguing — I'll quit."

I would like to know just what information of any significance or importance these electronic noises are conveying, also how can the average amateur be sure they are not commercial intruders?

Hold your ground Arthur, don't be intimidated by insults and threat — you have a very large number of supporters!

Keith Scott VK3SS
34 Henry Street
Maffra, Vic. 3860

□ □ □

TO THE EDITOR — NOT THE CASE

I was interested to read in the CARF journal that you had expressed interest in CARF because you understood Canada was one of the few countries where the second society had some measure of IARU approval. That is not the case, as under the IARU constitution only one society is a member of IARU.

CARL was one of the founding members of the International Amateur Union in Paris, France in April 1925, and has represented Canadian amateurs internationally for the past 62 years.

With very best wishes to you and the membership.

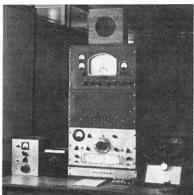
73
Sincerely
Thomas B J Atkins VE3CDM
CRRL President
Treasurer, IARU Region 2
55 Havenbrook Boulevard
Willowdale, Ontario, M2J 1A7.

□ □ □

MEMORIES

The accompanying QSL cards and photograph take us back a few years.

The VKZ and VHE go back to the early days of 1930. VKZ was in Alice Springs in 1934. Joe Kilgariff, the owner/operator states that he was using a petrol engine driving a generator which was situated 10 feet (three metres) from the receiver which was rather noisy!



BF

BF

■ ■ ■

PRESERVATION

The VK3 Division of the WIA is to be commended for its initiative in reserving selected rare and unusual DX QSL cards of Australian amateurs, for posterity.

The fate of most QSL cards is either the dump or incinerator. This is a sinful waste; there are better uses for those pieces of 5" x 3".

I am in the process of collecting 40 000 of my own DX QSLs — accumulated over a period of 50 years — and have divided them into four categories:

1. Those rare and early cards, with a personal story attached, which I will keep filed or mounted on display.
2. QSLs with postage stamps affixed will go to stamp collectors.
3. Ones in the form of a picture card (and they seem endless) are being given to primary schools. Teachers tell me they are great for various projects undertaken by pupils.
4. The discards, which will be dropped into the incinerator.

I would be grateful to hear from any reader who can suggest other uses. Also, I will donate QSLs to anyone wanting cards for bonafide purposes; eg museums, clubs, etc, who can use them as a back drop to their displays.

Pre-war "rarities" are now very, very thin on the ground. How many OTs still have cards from AC4YN Tibet, PK6XX Celebes, XU8CR Shanghai, G9AR Manchuria (now Mongolia). All these cards (and many more) tell a story to themselves. Mine have all been lost — so, let us preserve what is left, as long as it is possible.

Alan Shawsmith VK4SS
35 Whynot Street
West End, Qld. 4101

■ ■ ■

HAVE WE GOT IT ALL WRONG?

What all wrong? Amateur radio towers...

Fortunately, in Wagga Wagga, we have been able to have towers, but I have just moved to a new home, and this time I was actually asked to submit a rough plan of my 15 metre tower. I was granted council permission to erect that tower. However, my new location is at the top of a hill, in an area of new and very attractive homes. The question was 'did I really want a huge, great tower that would stand out like a wart on the landscape?'. 'No!'

What I now have is a three-section wind-up tower (bought for \$30), to which I have made some minor modifications. Wound down, the tower sits just above the gutter line, the rotator and TH3 about half-way between the gutter and the level of the ridge of the roof, and the two metre Yagi most people take for a new type of television antenna. I am in the motor industry, so was able to borrow a spray gun to paint the tower to match to colour of the bricks, and I am very satisfied.

Sure, I have the task of winding my tower up when I want to transmit, but I can now climb my tower to a reasonable height to work safely on antennas when I want to, and if I have need to, I can drop it on my own — something that was quite impossible with my free-standing tower. When I needed to move that it was necessary to use the winch on a Land Cruiser, and even with that I was almost killed. Now I have a tower which, extended, is identical in height to my original free-standing one. Just one more thing — has anyone any idea how I can make recoil drums to automatically wind-up the guywires when the tower is wound down?

Finally, instead of having amateurs fighting every city council in Australia, could a committee of building engineers belonging to the WIA design a tower suitable to the Unified Building Regulations Board? It should be suitable to be built for the best part by a handyman. A plan approved by such a board would tend to be acceptable to most council engineers — they do not want hassles. In other words, what I am saying is that, just as the WIA works with the DUTC, so it should also work with the UBRB. Put all your effort into this idea,

and ultimately you will save members thousands of dollars in years to come.

David C Brand VK2PGE
4 Tolland Close
Wagga Wagga, NSW. 2650

■ ■ ■

HAPPY 1988!

I notice the discussion on the future of amateur radio has petered out but there are a couple of things I feel obliged to say following some QSOs last year.

The consensus was that amateur radio is just a hobby and as such should be enjoyable. It is agreed that, due to the need for organisation, AR and so forth a certain business aspect and some commercialism is unavoidable, rather, it is necessary and acceptable. But, amateur radio was never, and should not be, a rich man's hobby. Unfortunately, the home-brew AM days are gone, parts are not readily available, SSB rigs need a lot of building and adjustment and test equipment to do so is at a premium. The black box reigns supreme and frankly, how the insides work is about as much use to an operator as Newton's knowledge of the laws of motion when riding a push-bike.

Such has been the advancement of amateur radio and the multitude of new facets that many old timers have been left behind, technically, as well as financially.

A similar technological revolution in the motor car industry put many old time mechanics out of work. (A recent article by the NRMA warns of the unskilled tampering with computerised cars).

Many black and white television technicians gave it away when colour television arrived (for those that joined the hobby at an advanced age).

Now we are saying that OTs should remain novices because they are ignorant of packet radio, RTTY, satellite communications, and what-have-you. It just does not make sense, particularly when all they want to do is rag-chew with old mates and new acquaintances — on all bands and at a decent power level. Newcomers to amateur radio are confronted with the same obstacles. In Summer, 80 metres goes dead during the day and 40 metres works but they can't use it. Two metre operation is somewhat limited.

I repeat, it is a hobby, not a life or death game as with motor vehicles! I cannot envisage any catastrophic calamity resulting from upgrading any novice with both Morse and "time served" experience behind him.

Last year, Brenda remarked, somewhat facetiously I thought, that a lot of old timers hadn't done a course in transistors, etc and ought therefore to 'upgrade'. I respectfully point out that the licence is primarily to maintain correct operating procedures in the same manner that a driving licence supposedly guarantees one's ability to drive a car in traffic or a shooters' licence means you are able to fire a gun. How many shooters know anything at all about the different explosives in a cartridge? The only time solid state knowledge is really necessary is when you are actually designing a piece of equipment — and most amateurs that have a go at designing learn very quickly!

One of the traps in educational circles (into which I fell myself) is that teachers and their ilk become not only too smart for themselves, especially in setting examinations, but of dis-service to their students, whom they are supposed to help. The type of examinations, written, multiple choice etc has less to do with fair assessment than the straight forwardness or honesty of the question itself. An frankly, I have tired of picking out the ambiguities and often nonsensical, even incoherent statements and questions in the sample examinations I have read.

The most pitiful aspect is that it is possible to rote learn all the answers, pass the examination and still know very little about the subject.

By definition, the term novice means newcomer, someone who lacks experience. This is true of

recently fully licensed amateurs too. Many up-graded amateurs crammed and rote-learned for the big event and are often not much more technically advanced than the novice.

Why not have one examination? An Amateur Radio Licence Exam. Upgrading to full call could be by Morse speed and a decent sized log as I believe is done in Canada.

Cut out all the packet radio/ satellite etc questions and stay with basics. Safety precautions, regulations, radio fundamentals, antennas, interference and allow amateurs to delve into other facets of the hobby if they want to. They will acquire the necessary knowledge and skills. I am sure my MD did not get questioned on brain surgery at his examination.

I believe amateurs are special people, but it is not their knowledge that makes them so, it is their dedication to their chosen hobby. Talk of lowering standards is thoughtless because elimination of rote-learning for unintended activities allows more time for study of the basics.

Do we need more amateurs? Do we need to increase WIA membership? Are we supposed to be a group of multi-specialised boffins or do most of us settle for basic radio communication, rag chews and exchanges of ideas?

Surely it is time for us to take stock and get on with what used to be an uncluttered and enjoyable hobby.

73
Don Law VK2AIL
RMB 626, Adelaide Road
Tumbalong, NSW. 2729

■ ■ ■

TRAVELLING AROUND

With reference to the letter in December's AR by Art Oliver VK6ART, I fully agree with Art and some agreement should be reached with regard to the frequency 14.106 MHz.

I have been a traveller checking into the net since September 1983 and have found this a very valuable service.

During my last trip, in August 1987, I had great difficulty in making contact with the net due to the packet radio interference. Of course, I realise, as Art has stated, no amateur has exclusive right to any frequency, but during many travels over the past few years I have come to rely upon the 'Travellers' Net for information and advice. It is comforting to know that at least once every 24 hours there will be a contact. I always leave Art's telephone number with my friends so that, if an emergency arises, I can be contacted. Our trips, incidentally, cover all Australia with no fixed itinerary, the last one being 15 500 kilometres and taking three months.

Please keep up the good work Art, together with your team of helpers — we travellers rely upon you and enjoy our contacts.

Ed Dyring VK2ED
PO Box 3
Gosford, NSW. 2250

■ ■ ■

CATCHING UP

The Christmas break gave me the chance to read a pile of ARs going back to April last year and, having seen all the letters to the editor and all the articles on the future of amateur radio, I would like to contribute my comments on these subjects.

1. It amazed me to find amateurs clamouring for 'equal rights for novices' over a bureaucratic error in Canberra with Japan. (It reminded me of when opportunists rushed in to give 27 MHz to the CBers). How about we look at the principle involved and see how good our foreign affairs people are at diplomatically reversing the mistake so as to maintain our standards?

2. If we are going to talk about a common band for all licence classes, let us make it a separate issue. It is a great idea; why not allow it on 70 centimetres FM? This frequency needs populating for its survival, it has equipment similar to two metres,

and it helps keep a lot of people away from the nonsense on two metres.

3. Of all the proposals looking at our hobby's future, John Anderson's stands out as the most logical, objective and readable (AR, October 1987, page 28), and I commend it to anyone seriously interested in the subject.

4. Finally, on the presentation standard of our magazine, Colin MacKinnon has said it all (AR Letters, September 1987 and November 1987). I too am prepared to pay the extra few dollars. To the AR Team: keep up the good work (I especially like the September issue content) and let us get going forward again.

Yours faithfully
Gareth Davey VK2ANF
18 Grafton Crescent
Dee Why, NSW. 2099



HELP ME PLEASE!!!

Through the columns of the magazine, I wonder if anyone in Radio-land can help me?

Having an interest in "earlier" model radio, mainly between 1920-1930, I am looking for a technical book entitled *The Australian Official Radio Servicing Manual, Volume 1*. Not really your off-the-shelf, readily-available book, but perhaps some enthusiast reading this has a copy no longer needed and willing to pass it on to a fellow enthusiast, just longing to add it to a reference collection. My the same token, the writer is quite prepared to purchase this volume, if that be the wish of the owner.

This could be a "tail order". Thank you and I remain, in appreciation,
Yours sincerely,
F J M Elliott
15 Lincoln Street
Forster, NSW. 2428

Individual preferences and prejudices will always exist, but they must surely be subservient to the main issue, which is the continuance of the hobby.

Comparing the VK amateur population with that of G, (17000 to 62000 in 1987), and the WIA subscriptions with those of the RSGB (\$A49 maximum against £18.50 (\$A45.50)), it seems to me that, as both societies have the same tasks, the WIA is underfunded.

Come on chaps — pay up and stop whingeing! It is in our own interest!

I became a member of the RSGB in 1948 and the WIA in 1986, whilst visiting VK for the first time for a two month holiday. I hope to continue in membership of both societies for many more years.

Yours faithfully,
S Arnold Matthews G3FZW (ex-VK4AUN)
2 The Parchments
Lichfield
Staffs
WS13 7NA
England

Solution to Morseword © 14

Across: 1 stare 2 Lima 3 felt 4 sang 5 for 6 atop 7 inner 8 quilt 9 gave 10 hear.

Down: 1 hip 2 lap 3 Eros 4 bend 5 sots 6 does 7 waft 8 Mars 9 vow 10 wife

	1	2	3	4	5	6	7	8	9	10
1	*	*	*	*	*	*	*	*	*	*
2	*	*	*	*	*	*	*	*	*	*
3	*	*	*	*	*	*	*	*	*	*
4	*	*	*	*	*	*	*	*	*	*
5	*	*	*	*	*	*	*	*	*	*
6	*	*	*	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*	*	*	*
8	*	*	*	*	*	*	*	*	*	*
9	*	*	*	*	*	*	*	*	*	*
10	*	*	*	*	*	*	*	*	*	*

IN VK6 WEST-AM RADIO for



ICOM

CALL GEOFF VK6YR ANYTIME

(09)332 17 13

9 HICKS ST LEEHONG WA 6156

BANKCARD MASTERCARD VISA

REGISTERED BUILDER (DORAZ PTY. LTD.) TRD.

A.J. & J. COMAN

BUILDERS & DESIGNERS OF:

- NEW HOMES • EXTENSIONS
- RENOVATIONS & ADDITIONS
- CUSTOM BUILT KITCHENS
- BATHROOMS • BACK HOE HIRE

57 BULLA ROAD, BULLA

307 1392



MEMBERSHIP

As Bruce Kendall VK3WL, has solicited comments from readers of AR, I (a comparatively new chum to amateur radio), have decided to put pen to paper and have my comment.

1. Bruce, in my opinion, both in your letter of September 1987 and that in February 1988, you appear to me to be making a considerable amount of sense with regard to lagging membership in the WIA.

2. One reason why you have had so few comments could be, simply, that the readers of AR are either comatose or agree wholeheartedly with your ideas.

Bruce, as you obviously know your subject, I suggest with respect, you approach our Federal Body and volunteer your services as Marketing Officer!

Good luck.
Tony Williams VK2DJW
PO Box 131
Wahroonga, NSW. 2076



COMPARISONS!

Reading AR over recent months, I find it disheartening to note the number of contributors to *Over to You!* who seem to look at the WIA from a "what-can-I-get-out-of-it" stance, with the accent very much on the I. This is a bad attitude: at best short-sighted; at worst selfish, and in the long run, self-defeating.

Our hobby is at all times under pressure from powerful interests which see us as unnecessary. National societies and the IARU provide a bastion of defence, but they cannot operate to the best advantage without adequate funds, which must come from individuals in the main. It seems to me therefore, that it is an obligation, rather than a choice, to support one's national society because it is for the good of one's fellows.

RF Design Engineer

- Suit RF Hardware Engineer or Graduate with such an interest
- Salary negotiable reflecting experience

This company is one of the world's leading innovators in state-of-the-art analytical instrumentation, its pre-eminence reflecting the considerable emphasis being placed on new product development.

The development of new products requiring RF generators up to 2 Kw in the HF - VHF frequency range necessitates the appointment of a specialist RF Design Engineer to complement the existing multi-discipline project team.

Apart from a strong theoretical background and skill in Engineering Mathematics, you will hopefully have experience in the design of high powered RF generators, associated control systems and power supplies. You will have completed formal engineering qualifications and be currently working in the design of high powered RF equipment.

An outstanding long term future in this committed, high technology company is assured.

Written applications, in confidence, quoting Ref. No. 4-1307. Telephone enquiries on (03) 654 4544.

FINLAY MOLLARD ASSOCIATES PTY. LTD.

Recruitment Services

64 Jolimont Street, East Melbourne, 3002.

RADIATION THREAT FROM THE CATHODE RAY TUBE SCREEN

Also including: Projects — build a patch bay, speech controller, voltmeter; Optical Fibre Measurements; Sydney's Bicentennial Power House Museum; Circuits; News; Kilohertz Comment; Videotex News; latest Products; and incorporating Australia's highest circulating Hi-Fi Magazine.

OUT NOW

Electronics Today

INTERNATIONAL



WIN A MODEM . . . COMPUTER!

Silent Keys

It is with deep regret we record the passing of:

MR SID BRYANT VK3CI
MR FRANK WILLIAM CHAPMAN VK6CC
MR J F CHRISTENSEN VK3DJ
MR R F FITZSIMMONS VK3FI
MR A HART VK2BXN
MR K J HENDUCKS VK7ZAH
MR W D ILIFFE VK3QY
MR V LEONARD VK3PJ
MR J A MACKAY VK4QX
MR LAWRENCE GEORGE MARSH VK2DWH
MR JOHN (MAC) MCCONNELL VK3RV
MRS E L MCGRATH VK4BEM
MR W O (BILL) THOMAS VK2NXT
MR FRANCIS GEORGE WINDSOR VK2CFW

as part of the South Australian Maritime Museum. Carl was looking forward to the day when the tug would be "fired up" and given a trial run at Port Adelaide. He had hoped to be able to ride on the first trip. Unfortunately, he did not live long enough for this to happen.

He enjoyed cycling and often rode his bicycle for several kilometres before breakfast.

His cheery comment of "You beaut!" will no longer be heard when he was amused by something which happened.

There was a goodly collection of "bits and pieces" accumulated over the years and Carl was able to supply a collection of usable valves to Bob Roper VK5PU, now resident in the United States, when Bob wished to give a demonstration there on "the old days on one metre".

To Mrs Sappiatzer and family, the Division extends its sympathy in the loss of their husband and father, Carl.

—Compiled by Tom Laidler VK5TL from information supplied by Carl's son, Douglas VK5ZDJ

CLAUDE WELSH VK4DK

With regret, the passing of Claude Welsh VK4DK, is announced. He passed away in Mackay Hospital on January 17, after a long period of illness.

Claude was 73 years of age at his passing. Born in Warwick, Queensland on December 30, 1914, his early working days were spent at the Warwick Times newspaper.

Licensed as an amateur in 1936, he was one of the first operators in his city. His original call sign was VK4CW.

Claude joined the RAAF at the beginning of the 1939-46 war and spent the war years as a Radio Operator, where he met many other well-known amateurs of that era. After the war, he worked in the radio-field and operated in VK5, 7 and 3 before returning to Mackay in Queensland.

Ill health caused his early retirement when he became a TPI War Pensioner. He always retained an interest in amateur radio as an active WIGEN operator, and gave publicity on amateur radio via his local newspaper who also published several stories on Claude's life and assistance given to various people on air, during emergencies.

Claude managed to speak the Japanese language fluently and had many JA friends on 15 metres.

Many American and European amateurs visited Claude when they passed through Mackay en route to the Barrier Reef, as Claude was well-known on the DX bands.

Local operators were also helped with their CW to obtain licenses when required.

Claude's wife, Isabel, was also well-known to amateurs all over the world and to her and family, our deepest sympathy is expressed at Claude's passing.

My personal QSOs with Claude, over nearly 50 years, will be long remembered.

Al Carter VK4KAT

LESLIE RAYMOND JOHNSON VK3ZPB

It is with deep regret that the Western and Northern Suburbs Amateur Radio Club reports the passing of Les on December 7, 1987, aged 79 years.

Les was a founding member of the club in February 1970, the first Secretary from 1970 to 1974 inclusive, Member of the Year in 1975, and had also been elected a Life Member of the club.

He was Magazine Editor for several years and a committee member for some time.

Until recently, when his health prevented it, he was an active and enthusiastic supporter of all club activities and always enjoyed a natter at meetings or on the two metre club net.

Les was a friend who will be greatly missed by the members.

Tom Page VK3AGH

VERNON FRANCIS KENNA (ex-VK4FK) VK2JR President WIAQ 1933 President IREE 1968-69

Vern's abilities were such that he excelled in every task he undertook. Without doubt, his short term as President was WIAQ's loss; he possessed physical bearing, rhetoric and the ability to fill the WIA's top position in Queensland very admirably.

Born at Brisbane on May 6, 1908, Vern showed a very early interest in radio, qualifying for his AOCF as VK4FK, in 1927 and constructed and operated receiving and transmitting equipment at Hamilton for a number of years. Those who knew him claim he lectured on wireless to students, when in his late teens and his commitment to radio was total throughout his life.

Vern commenced employment in the PMG in 1924 as a junior mechanic-in-training. He advanced through technical grades, finally assuming the position of senior engineer in the radio section of the headquarters administration in Melbourne. In 1961, he became Federal Controller of Technical Services with the ABC until his retirement, late 1960s.

From 1931 to 1934, Vern was a member of the technical staff at Broadcast Station 4QG, Brisbane. In 1934, he moved to the PMG Research Section in Melbourne where he assisted in the development of the now familiar top-loaded broadcasting radiator and also VHF radio relay equipment designed for use on outside broadcasting work. He qualified as an Engineer in 1935. During the early stages of WWII, Vern was concerned with the installation of aeradio and assisted DF equipment at a number of centres in Queensland and other adjacent Pacific areas. Then, in the light of the critical war situation, he was involved in the urgent removal of the NBS metropolitan stations 4QG and 4QR to preferred sites outside the city limits.

In 1950, Vern represented Australia as a delegate to the International HF Broadcasting Conference held in Italy. He also found time to rewrite the constitution of the Flying Doctor Service in order to give it a Royal Charter and a new title, Royal Flying Doctor Service (RFDS).

Dubbed "Marconi" by his pre-war peers, he rightfully earned his title and that of "Pathfinder" because of his very early experiments with VHF. Vern became a Silent Key on Christmas Day 1987, after previously suffering a heart attack.

Alan Shawmorth VK4SS

HAROLD F BREMERMAN VK4HB

The WIAQ sadly announces the death of one of its long term members, viz Harold Bremerman VK4HB.

Harold's interest in wireless began whilst he was still a teenager living in Sidcup, England, where he gained the CQCP as a very young man. He emigrated to Queensland during the early 1920s and was one of the many enthusiasts who assisted Thomas MB Elliott with television experiments in the Observatory Tower in 1929. Harold was able to construct a NIPKOW Disc which

Obituaries

CARLOS GEORGE SAPPATZER VK5SS

It is with deep regret that we record the passing of Carl on January 5, 1988, at the age of 72 years.

Carl was born at Millicent, the eldest of three children. The family moved to Adelaide in 1919. Carl was then about three years old.

As a lad, he had experimented with radio and there have been many stories of his crystal and valve constructions.

It was not until the Second World War, when he joined the RAAF as a Radio Operator, that he became more heavily involved with radio.

After gaining his full call licence he taught Morse code in the old Methodist Mission building in Franklin Street, Adelaide. In 1957, he started Morse code practice sessions on the old one metre band. At this time he also gave theory lessons from his home. He also found time to spend some years on the Divisional Council of the VK5 Division.

Involvement in exhibitions held at the Royal Adelaide Showgrounds and the Adelaide Town Hall were part of his commitment there.

Carl also encouraged young people in their radio activities; some of whom have gone on to successful radio careers.

As a result of his contacts on radio, he made many friends as well as interested listeners. VK5 Sugar Sugar was one of a group holding regular contacts on the 7 MHz band in years gone by. Among his associates there, were the late Frank Bentley VK5MZ and Clyde Cook.

In later times, he met up with others in the 28 MHz band. Those involved were Peter Barlow VK5NPC, Jack Dew VK5JX and the writer.

Carl's other interests (yes, he was a man of many parts) included rifle shooting, photography (he had many films of steam trains), restoration of old steam locomotives (as part of a group he delighted in referring to as "Dad's Army"). His train films have been bequeathed to the South Australian Railway Historical Society. Many hours were spent on the locomotive restoration work, particularly the "Duke of Edinburgh" used recently to convey the Prince and Princess of Wales on an historical journey in South Australia. Carl was unable to take part.

Another of his associations was work carried out on the old steam tug boat, Yelta,

used square scanning holes, for the first time. This resulted in much better picture resolution.

In 1932, he obtained his AOCIP at Brisbane. Harold broadcast the Institute News on VK4WIA for a period of 15 years; his clear, slightly English voice became synonymous with this service. He was a Charter Member of the Brisbane DX Club and always participated in the RD Contest.

A qualified electrician, Harold was employed by the following firms: *Courier Mail* for 15 years, Besley and Pike for eight years and Mount Olivett Hospital, as Chief Engineer for four years.

Being a commercial air pilot, he was an instructor with the Queensland Aero Club for many years and also found time to do long stints as a trade teacher at the Central Technical College in Brisbane.

A Life Member of the WIA, Harold rightfully earned the title "Pathfinder", because of his early experiments. Aged 86 years, Harold became a Silent Key on January 21, 1986, and is survived by his YF 'Blondie'.

Alan Shaws Smith VK4SS

HAMADS MAKE IT HAPPEN

ANTENNAS & ACCESSORIES

We manufacture a comprehensive range of HF, VHF and UHF antennas, baluns, power dividers, etc, to suit your application.

Two of our log periodics provide continuous coverage from 13 - 30 MHz including WARC frequencies and replace outdated tribanders. Now in use in 20 overseas countries.

- HIGH GAIN VHF & UHF AMATEUR, SCANNING & TV ANTENNAS
- BUTT SECTION TRIANGULAR ALUMINUM TOWERS FOR FIXED OR TILT OVER APPLICATIONS (refer March/April 1987 AR)
- COMPLETE RANGE MIRAGE (USA) 5 YR WARRANTY 6m, 2m, 70cm AMPLIFIERS & WATT/SWR METERS
- ROTATORS, COAX CABLES & NON-CONDUCTING GUY & HALYARD MATERIALS
- SELECTION OF POWER TRANSISTORS AT FRIENDLY PRICES

Thank you to our many satisfied clients for their patience since our disastrous fire of April 1987.

Write or phone for free Catalogue.

ATN ANTENNAS

56 CAMPBELL STREET
BIRCHIR, VIC 3483
PHONE: (054) 92 2224

DEADLINE

All copy for inclusion in the June 1988 issue of *Amateur Radio*, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, April 18, 1988.

IONOSPHERIC REPORT

The IPS Radio and Space Services summary for December contained some information that will be of interest to those new to the DX bands.

The monthly indices values are as follows:

Monthly averages for them are 10 cm flux 94.9,

Sunspot number 26.5

A index 7.7

I index 54.2

Two solar flares on December 26.

Solar activity in December was low except for these two flares. The region which produced these flares seemed likely to produce further energetic events but had not done so by the end of the month.

The monthly averaged 10 cm flux value for December was lower than those of recent months, being the lowest since June 1987.

Geomagnetic activity was extremely quiet for December with only three days on which the A index exceeded a value of 20. The extended period of quiet geomagnetic conditions from December 24 to 31 was a feature of the month. On December 5, the field was at active levels. December 16, had active to minor storm levels. December 16 to 17, the field was at storm levels early in the day and generally active on the 17th.

Ionospheric disturbances for Sydney — December 6, MUFs were slightly depressed at times and depressed on December 11 and 17.

It is now clear that the sunspot cycle, Number 21, reached its end during September 1986. Since then, the sun has become more active, telling us that the new cycle, Number 22, has begun. Also, the sunspot regions, visible throughout 1987, have been appearing at higher latitudes. This is another good indicator of a new cycle. The smoothed sunspot number has risen very quickly this past year. In fact, the rise has been so fast that it is breaking all records and suggests that we could be in for another high sunspot maximum. We expect a continuation of the rapid rise of the sunspot number in 1988 with the yearly average working out to at least 60. However, associated with this rise in sunspot number, we will also experience an increase in the number of solar flares. This will mean more frequent shortwave fadeouts. Also we will have an increase in the number of flare induced geomagnetic disturbances which will also disrupt or degrade HF communications. The most reliable predictions of the amplitude of the new cycle are telling us that the sunspot number should reach a peak of around 150. IPS previously gave a figure of 130 as their estimate. The rapid early rise of the cycle in 1987 supports this view but it is early days yet. If the cycle progresses as the average of previous cycles, then the solar maximum can be expected in late 1989 or early 1990.

Remember a cycle always rises faster at its beginning and is much slower during the fall.

—Contributed by Frank Hine VK2QL

Hamads

PLEASE NOTE: If you are advertising items FOR SALE and WANTED please write each on a separate sheet of paper, and include all details, eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. Please do not use scraps of paper.

● Please remember your STD code with telephone numbers

● Eight lines free to all WIA members. \$9.00 per 10 words minimum for non-members

● Copy in typescript, or block letters — double-spaced to Box 300, Caulfield South, Vic. 3162

● Repeats may be charged at full rates

● QTH means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for re-merchandising purposes.

Conditions for commercial advertising are as follows:

\$22.50 for four lines, plus \$2.00 per line (or part thereof)

Minimum charge — \$22.50 pre-payable

● Copy is required by the Deadline as indicated on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and transmitting applications. For data and price list send 105 x 230 mm SASE to: RJ & US IMPORTS, Box 157, Mondale, NSW 2223. (No inquiries at office please.) 11 Macken Street, Oatley, Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albany, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza, ACT.

COMPONENTS: Wide range of parts for receiver, transmitter and other electronic equipment. Semiconductors, valve, plate bypass capacitors, coaxial connectors and many more. Make enquiries welcome. Sorry, no catalogue available. D Danner Electronic Sales, 51 Georges Crescent, Georges Hall, NSW 2198. Telephone: (02) 724 6982.

WANTED — NSW

AUSTRALIAN OFFICIAL RADIO SERVICING MANUAL: Vol 1. Required for a reference collection. Contact F J M Elliott, 15 Lincoln Street, Forster, NSW 2428. Ph: 54 5583.

CIRCUIT DIAGRAM: or pinout supply details for RC7C transistor. Also, old valve manuals & valve circuits for any valve type equipment. R J Paxley, 71 Brown Street, Armidale, NSW 2350. Ph: (067) 72 9878.

DRAKE RTA, JRC NRD-S15 RECEIVERS: Also, old ARRL handbooks. Tony Ph: (042) 29 2573.

FV-101DM VFO: or FV-102DM VFO. R K Richardson, 12 Bowden Street, North Parramatta, NSW 2151. Ph: (02) 630 1621.

TWO 572B TUBES & BAND SELECTION SWITCH: for FT-201R Yaesu line. Use for parts or for sale parts considered. Ron VK2BKN, QTH Ph: (069) 72 1021.

WANTED — VIC

ALLIANCE TENNA ROTOR: Lightweight rotator in good order. Merv VK3AFQ, QTH Ph: (060) 24 2537.

AR8: A model in good order. Hapburn VK3AFQ, QTH Ph: (03) 596 2414.

IC-730, IC-731: or similar compact HF mobile transmitter. Also a Yaesu line. Use for parts or for sale parts considered. Ron VK2BKN, QTH Ph: (069) 72 1021.

SERVICE/WORKSHOP MANUAL: for Yaesu FT-707. Circuit/Service data sheet for early (1930s) Astor radio, Model FF 72 found dial with two magnifying lenses! Price & particulars to VK3CQK, QTH Ph: (056) 52 1332.

TOWER: Crank up type in good condition. Denis VK3CUI. Ph: (054) 43 4530.

70CM MULTIMODE TRANSCEIVER: Will exchange for Yaesu FT-7B in excellent condition. Roger VK3XRS. Ph: (051) 56 8291.

WANTED — QLD

BOOK: Ex-serviceman wants to buy or borrow old British/Australian Army book Signaling Volume III, 1936. Would someone help please. VK4ER QTHR. Ph: (07) 396 1603 AH.

EARLY WIRE AND WIRELESS TELEGRAPHY EQUIPMENT: Also handbooks for the same. Per 1972 Bill Orr, Radio Handbook. Contact Fred VK4NMA, QTHR or Ph: (07) 396 3521 after 6 pm.

FM BOARD FOR YAESU FT-102: Yaeu part C0023470 (Board No PB2347). Will pay fair price. VK4AEM, QTHR. Ph: (07) 912 1630.

ONE VALVE UV-201A/UV-201A: else UX-200A, UX-112, CX-300A, CX-301A, UV-199, CX-399, UV-224 or UV-227 for early Flying Doctor set. Marvyn VK4SO, QTHR. Ph: (07) 846 3575.

YAESU FT-101 SERIES MAINTENANCE SERVICE MANUAL: Must include 101E. Reasonable price paid. Alex VK4RU, QTHR. Ph: (07) 265 3269.

WANTED — SA

OPERATING & MAINTENANCE MANUAL: for Teletype Service Model D52. Reverse charges John VK5KAF Ph: (087) 35 2028, or PO Box 578, Millicent, SA. 5280.

WANTED — WA

M-600 MULTI-MODE COIL RECEIVER: or Pakrat PK64. Ph: (09) 341 4361.

FOR SALE — ACT

YAESU FT-207R: 2m hand-held with speaker/mic, NiCAD rechargeable battery, flexible antenna, charger & manual. \$220. Vic Burman VK1VB, QTHR. Ph: (062) 58 0811 AH or (062) 46 2302 BH.

BEAM: 5-element HYgain No 411 10 metre, 1 Crown rotor Model CAR 24. Both in manual. Perfect condition. \$300. 1 Sideband SE-502 28.35 to 28.6 MHz, new in box. \$90. Norm. Ph: (065) 68 2544.

CHEAP DX: FT-200 black panel, custom power supply, mic, leads, English manual, \$290 including freight. Proof of licence essential. Doug VK2DHF, PO Box 584, Lithgow, NSW 2790. Ph: (063) 52 1305.

DECEASED ESTATE: VK2AXP FT-102, FT-200, Eddystone 770 RZ, GDO, VFO, Small multimeters. For appointment & inspection Ph: (02) 524 6282.

HY-GAIN VERTICAL MULTIBAND ANTENNA: 10 to 80 metres complete with manual & in good condition. Price \$95. Al Rice-Davies VK2AXR, Ph: (02) 477 6275.

KENWOOD R-2000 COMMUNICATIONS RECEIVER: 150 kHz to 30 MHz SSB AM FM 10 memories scan, digital & clock display, timer, GAG, very little use. \$350. VK2BD. Ph: (02) 88 3273.

NATIONAL RJX-1011D TCVR & XTLN VFO: Shure 444 dual impedance mic, all max 100 hours use. \$1500. Bruce. Ph: (02) 570 5840 after 6.30 pm.

SWAN 350 & SWAN 500CX: 5 band transceivers with PIS & handbooks. Buyer to collect. Ph: (02) 651 3006.

YAESU FT-707: plus power supply FP-707 & antenna tuner. Won't sell separately. Lot \$950. Richard VK2CRB. Ph: (02) 546 6498 AH or (02) 887 7212 BH.

FOR SALE — VIC

ANTENNA: 80 to 10 metre vertical. DSE Model NO D-4305. 700. Neil VK3JNT, QTHR. Ph: (03) 754 6410.

COMPLETE RADIO STATION: 14X-Tx, R-48 RZ, matchbox speaker supply, Speech processor, Ameco preamp PCLP, RFE-100 digital adapter, many spares, all manuals. The lot \$850. Bill VK3WK, QTHR. Ph: (055) 67 1048.

ESTATE OF THE LATE VK300J: FT-ONE. In mint condition. 6m hand, VAG card, Keger board, DC power cable, filters, CVM, 107 FM 6.9 MHz AM & SSB, VU-35 mic, FC 902 500W ant tuner. FTV-107 144/432 transverter, 144 fitted. FT-208 FM hand-held with speaker mic. Leader

solid state signal gen. LPM-615 GDO with all coils. Hansen SWR/power meter. TH6 20/15/10 beam. AS333 printer with paper tape calc excellent. Siemens RTTY with tape reader & monitor. CS-20 2-way coax switches. Rapar RLC bridge. Offers, inquire John VK3ABW, Ph: (03) 586 7426 for inspection at VK3DOJ's QTH.

GRUNDIG COMMUNICATIONS RECEIVER: TR-807 11 bands, 7 bands, 150 kHz to 30 MHz & 4 bands from 50 MHz to 174 MHz. AC & DC. As new. \$500. Klein & Hummel TU alignment generator, pattern, IF & AF FM. Mod FS-4A. As new. \$500. Ph: (052) 48 1410 AH.

HALLCRAFTERS SX-100 HF COMMUNICATIONS RECEIVER: With matching loud speaker. Excellent condition. \$196. Ph: (052) 82 3167.

HELICAL WHIP ANTENNAS: Overcut 27 MHz CB, ideal for 28 MHz mobile or rebuilding into 2 metre mobile. \$2 ea. Peter VK3KEH, QTHR. Ph: (03) 728 4023 after 6 pm.

KENWOOD TM-2550A: 2m transceiver with 50 watts out. 23 memories in mint condition with all cables & brackets & carton, etc. \$600. Geoff VK3GJ, QTHR. Ph: (03) 560 3773.

KENWOOD TR-751A: 2m all mode transceiver. Current model, has Mu-1 (DCL) Tu-7 (Tone unit) VS-1 (voice synthesiser) 6000 Hz, 8 amp regulated power supply & 5 element WW beam with 20 metres. RG-213 coax, mobile bracket, manual, original carton. \$950. Ray Dean VK3CDR (ex-VK3JO), QTHR.

KENWOOD TS-940S: Will sell one of my two. This one brand new, tested only \$300. VK3AJT, QTHR. Ph: (052) 78 2723. Licensed Amateurs Only.

SBE CONSOLE & BASE STATION: Excellent condition. Manual & all circuit diagrams. \$550. Ph: (03) 232 4169 after 8 pm.

SLOW SCAN TUBES: 2 off 7B7P, P7 Phosphor. 1 off 1P21 Image Intensifier tube. No charge. Send COD or pick up. Allen VK3SM. Ph: (03) 368 4406.

SIGNAL GENERATOR: Marconi FT 995A/5 1.5 to 220 MHz CW or AM & FM. Internal/external modulation. \$150. Ian VK3MZ. Ph: (03) 763 0595.

STANDARD C-8900: 2m 10W linear transverter \$220. Alanco LTD 230 2m 30W linear amp. \$30. Tim. Ph: (03) 723 3942.

TELETYPE DECODER: Dick Smith kit (K-6315), brand new. Complete & working with all documentation. Cost \$199, sell \$150 ONO. Security alarm module, Dick Smith Cat L5556, 5 selector (2 instant, 2 delayed). Siren driver on-board plus bell. Variable entry & exit delays plus alarm runtime. Perfect operating order. \$50. Apple II+ cards, disc drive for 2 drives \$85. Printer \$55. 280 575, 80 column CUP leads \$75. Serial (RS232C) comms C/W DB25 plug. Super serial comms (RS232C) C/W manual. Grappler — buffer card 128K RAM C/W manual \$100 ea. Hampack II card, run glass RTTY/CW on your Apple II, C/W software disc. Many features, good HF noise immunity. Perfect order, has worked HF DXCC \$200. Computer, EMRCR project, 8800 based, in perfect working order. 8 slot mother board, mounted in professional instrument rack. C/W keyboard, monitor, power supply, editor & Basic in ROM. All documentation \$200. Floppy discs, 5 1/4 inch, SSD, Xidex & Verbatim Datasite, all new in sealed boxes. \$30 box. Modern. MD212A intelligent. 300/300, 1200/1200. Fully compatible with Hayes Smartmodem. Auto speed/answer/dial. Tone or pulse. Half/full duplex. Inbuilt monitor with control program & command buffers. Brand new with warranty. Cost \$599, sell \$450. All plus freight. Ken VK3MNV. Ph: (03) 522 1476 BH or (03) 560 5178 AH.

TEN-TEC ARGONAUT 509 ORP 80-10 M: Incl hand mic, power supply, crystal cable, manual. \$420. VK3CFK, QTHR. Ph: (03) 579 3654.

TRIO OSCILLOSCOPE: Type CS1560A. Dual trace, 15 MHz handbook & probes. As new. \$550. Australian Office Radio Service Manuals Not to Not4. Complete set. VGC. \$210. W Babz VK3ACB. Ph: (03) 337 4902.

VTVM UNIVERSITY: with 20 kV probe. \$45. Receiver: VHF Aircraft wideband (receives signals 2.5 MHz either side of centre frequency thus avoiding critical tuning). Ideal for car, SWL, etc. \$60. 2m carbon base sin with Ch 8 rpr & Ch 40. Simplex xtal. \$30. Linear amp 2500 mtr 325W PEP with spare GMS. \$85. DC power supply, 12V, 5A, \$60. Merv VK3AFQ, QTHR. Ph: (060) 24 2637.

YAESU FT-707 TRANSCEIVER: WARC & digi readout. Yaeu FT-700 power supply to match. Yaeu ant tuner FC-707. All new, new case, new GMS. DC power supply, 12V, 5A. \$1250. Will separate. The lot \$1000. Keith Scott VK3SSS QTHR.

17 INCH BWD DISPLAY CRO: with 3" monitor display. Good order & complete with hardware. Also spare unit (not going for spares. \$150 the lot. BC348 Receiver with power supply. \$100. Hepburn, VK3AFQ, QTHR. Ph: (03) 596 2414.

FOR SALE — QLD

COLLINS KWM-3 TRANSCEIVER: with Collins 399C-1 outboard VFO & Collins S16F2 PSU. KWM-2 is fitted with Waters Compreamp. Model 359 & includes mic, handbooks included. All are in good clean condition. \$395. John VK4VK, 6 Toosi Street, Sorrento, Qld. 4217. Ph: (075) 36 1759 after 6 pm.

DUO-BAND YAGI: 4 element with balun included. Good condition. Ideal novices beam with HF propagation improving. Tim VK4NKH, QTHR. Ph: (076) 97 9118.

FM-321 70 CM: with mobile antenna. \$250 ONO. 8/8 Skeleton Slat J beam \$60 ONO. Chromides 1015 Duoband with balun \$110 ONO. Microwave models 144/1296 MHz transverter with GAAS/ET preamp & SSB electronics 12 W linear amp. \$800 ONO. Kevin. Ph: (07) 814 3006 AH or (07) 377 4286 BH.

HEATHKIT 2G-18 SHINE/SQUARE WAVE AUDIO GENERATOR: 1 Hz to 100 kHz. 8 ranges 3 mV to 10V RMS. Square wave 10V, 1V, 0.1V Pk to Pk. Panel meter indication for sine wave. \$75. Carriage extra. VK4ZFK, not QTHR. Ph: (077) 72 5535.

YAESU FT-101E, FV-101B VFO: Speaker, works well \$450. Kenwood TS-440C, power supply PS-50, speaker SP-430, 1 year old. \$1500. Wilson S13 tribander, 3 telescopic masts as is. Deceased estate. Kenwood TS-830S, VFO-120, service manual, excellent condition. \$900 ONO. Offers to Charles VK4BPI. Ph: (079) 52 1675 AH.

FOR SALE — SA

MICROWAVE MODULES: MML 144/100 LS 2 metre linear amplifier: 1 or 3 watts in — 100 watts out. Built in RX preamp. With manual, carton, etc. \$285. Terry VK3ATN, QTHR. Ph: (088) 63 1268, evenings.

TOKYO HY-POWER LINE AMPLIFIER: Model HLK-10 10-metre. Excellent condition. \$1275. Joan Iles VK5AVJ, 78 Mawson Road, Meadows, SA. 5201.

FOR SALE — WA

YAESU FT-707, FP-707, FV-7000M, FC-707: plus MD-18B, MH-18B VU-37 microphones. Mobile mounting bracket, DC cable, Clepsid Morse key, including manuals. \$1450 the lot including freight. Ph: (0911) 89 1638.

FOR SALE — TAS

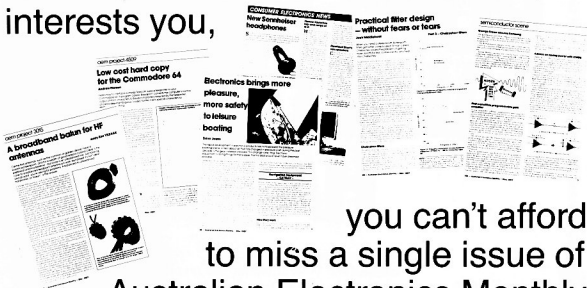
MFU-1224 COMPUTER INTERFACE: RS232C RTTY, CW, ASCII, Baudot, AMTOR, etc cable, it & software New & unused. \$320. Accessories to suit. Yaeu FT-209RH/FT & 709RH, FT-208R hand holds, CS11 soft leather case, YHT headset, PA3 charge adaptor. New & unused. What offers? VKTAN, QTHR. Ph: (033) 31 7914.

Advertiser's Index

ARMSTRONG	60
ATH ANTENNAS	13
AUSTRALIAN ELECTRONICS MONTHLY	63
A J & J COMAN	10
ELECTRONICS TODAY INTERNATIONAL	61
EMTRONICS	41
IAN J TRUSCOTT'S ELECTRONIC WORLD	48
COM AUSTRALIA PTY LTD	BC
KENWOOD ELECTRONICS AUSTRALIA PTY LTD	IFC
WESTMILL HALL	3
PRENTISS RADIO	60
WIA MAGPUBS	29 & 44
WIA (NSW DIVISION) NOVICE LICENCE	56

Monthly ESSENTIAL READING

No matter what area of electronics interests you,



you can't afford
to miss a single issue of
Australian Electronics Monthly

Incorporating Elektor Electronics

HERE'S WHY:

Edited and published by industry identity, Roger Harrison
VK2ZTB

You'll find something to interest you every month in Australian Electronics Monthly, no matter what your special interest might be. The magazine is "sectioned" into categories for easy reading and easy reference, each section headed by its own news column.

If you've found AEM hard to get in your newsagent,
DON'T DELAY. SUBSCRIBE TODAY!

SUBSCRIBE & SAVE!

Buying AEM at the newsagent each month costs you \$57/yr. A subscription costs just \$42 for one year, \$78 for two years!

YES! I want to subscribe for:

☐ Two years (\$78) ☐ One year (\$42)

I wish to pay by:

☐ Cheque ☐ Money Order
☐ Bankcard ☐ Visa ☐ Mastercard

Card No _____ Expiry _____

Signed _____

(Unsigned credit card orders cannot be accepted)

Name _____

Address _____

Postcode _____

Telephone: () _____

Issue by issue, 'AEM' brings you -

- **Communications coverage**
- news, reviews and practical features on RF techniques and radio communications, covering everything from circuit techniques to cellular radio, from satellites to amateur radio.
- **Topical technical features**
- covering consumer electronics, topical technological and scientific fields, current issues and circuit techniques.
- **What's new in the market**
- occasional features on new products and developments, giving topical and informative coverage of specific fields and product groups.
- **Practical computing articles**
- a whole section each month devoted to electronics enthusiasts exploring computing and computing enthusiasts exploring electronics.
- **Hi-Fi, sound and video news, reviews & features**
- independent, professionally conducted reviews from Robert Fitzell Acoustics; features from well-known writers like Dennis Lingane and Malcolm Goldfinch.
- **5 to 10 projects to build each month**
- the best from our Australian designers and the cream from the British Elektor.
- **Monthly Project Buyers Guide**
- each issue we detail where you can get the components featured in our projects as well as which firms are stocking kits of our projects.
- **Telephone technical enquiries**
- yes, you can speak to the editorial team direct and have your queries answered. We don't live in an ivory tower!

Send coupon to: AEM, PO Box 507, Wahroonga 2076 NSW

Regd Address:
1st Floor, 347 Darling Street, Balmain, NSW 2041

ICOM PUTS POWER IN THE PALM OF YOUR HAND.

Seven watts of power is a respectable output for any transceiver. Now imagine the possibilities of that much power packed into a multi-functional handheld.



That's what you get when you attach the optional IC-BP7 battery pack to the new IC-2GAT from ICOM. And even the IC-4GAT pumps out 6 watts with the same battery pack.

Plus you also get plenty of advanced features in the one simple-to-use package.

There are twenty memory channels and one call channel. With programmed scan and memory scan built in. A pocket beep function lets you know if particular subaudible tones are being transmitted.

The top panel digital touchstep switches and readout make frequency entry simple, especially when the unit is belt mounted. And the squelch monitor unit makes squelch control easier too.

After dark operations are no problem because the LCD backlight shows all displays. Then the light turns itself off when you're not using the unit.

In fact, all models have a power saver function built in.

So we don't just give you more power in the palm of your hand. We help you keep it there as well.

Call (008) 33 8915 or (03) 529 7582 for your nearest ICOM stockist.

They'll give you all the power you ever wanted.



ICOM

The Ball Partnership ICO 0015

